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PRACTICAL TEACHER:

A Monthly Educational Journal.

EDITED BY JOSEPH HUGHES.

> *'Knowledge is proud that he has learned so much,*
> *Wisdom is humble that he knows no more.'*
>
> COWPER—THE TASK, VI., 96, 97.

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Technical Instruction in Elementary Schools.

BY SIR PHILIP MAGNUS.

II. READING, WRITING, AND RECKONING.

THE best system of primary education would be one based on an extension of the principles of the Kindergarten. The ideas underlying Fröbelism are applicable to education generally, as properly there should be no break between the training of the Kindergarten and that of the elementary school. There should be a progressive development in the exercise of the senses by bringing them into closer relation with natural objects. The method of the Kindergarten should be extended to the elementary school. As regards Technical Education nothing else is needed. All that is wanted follows from the application of this principle. Children must, of course, learn to read and write in order that they may communicate with, and participate in the thoughts of, others. Reading and writing are adjuncts of speech. They are a necessary part of the equipment of every child for the discharge of all the duties of life. At best we can hope to gain by actual experience a small fraction only of the knowledge we should desire to possess. The rest we must acquire by availing ourselves of the experience of others. A great portion of all knowledge can be obtained in no other way. Experience cannot tell us what happened a hundred years ago. For a knowledge of the events of past times we are entirely dependent on oral traditions or on books. Geography might be learnt exclusively by travelling, and science by actual experiments; but if we were restricted to such means of information, our knowledge might be much more exact than it is at present, but it would be much more limited. We must depend to a great extent on the labours of others, both of those who have preceded us and of our contemporaries. But education, to be of any value, should enable us, by placing us in similar circumstances, to understand and realize the processes, by which the knowledge which we receive, so to speak, second hand, through books, has been acquired. We should know how to verify what we accept as true by having learnt, by actual experience, how such truths have been ascertained, and how such knowledge has been built up. This applies even to the teaching of history, which is a record of events, more or less similar to those which we ourselves from day to day experience; and, according to the method of instruction, are we enabled to distinguish among the records of the past, between fact and fiction, between what is probable and improbable. Reading, therefore, is in reality a means of widening our actual experience, and as such is an essential part of education. But, although in the hands of a skilful teacher instruction in reading may be made a useful mental discipline, its main object is to fit us to acquire the indispensable means of self cultivation.

After reading, writing is the most important part of primary education. Writing is a new language, enabling us to communicate at a distance with our fellow creatures, and to preserve for future reference our own thoughts. But writing is an art, and as such may be regarded as a part of technical education. To write well is a useful accomplishment, which has a commercial value. Of late, the art of penmanship has been too much neglected. There is difficulty now in finding youths who write well enough for the various purposes for which good writing is required in business and other offices. More time might, with advantage, be spent in acquiring an art which would be found serviceable to youths seeking employment at an early age. To enable children to write clearly and distinctly is a part of primary instruction; to enable them to write elegantly belongs to technical or professional education. But with a very little additional expenditure of time, writing might be so taught as to be commercially useful.

It has been suggested by very competent authorities that the teaching of drawing in its earlier stages may be combined with the teaching of writing. This has not been widely tried. But there is no doubt that the ability to form straight and curved lines, which is acquired by learning to write, may be utilised in drawing exercises, and that very simple combinations of the lines used in writing large text hand may be made to produce various patterns and designs, and help not only to train the hand, but also to exercise the imagination. Much more, however, than this is needed if drawing is to be taught as a useful art in our elementary schools.

The third of the essential elements of primary instruction is reckoning. I am not here concerned with the best methods of teaching arithmetic. The discussion of this subject belongs to special works on Method. But in the teaching of arithmetic a basis may be laid for the superstructure of technical education. To this end, too much time should not be devoted, in the earlier stages of instruction, to the explanation of processes. Arithmetic should be taught in the first place as a useful art. The explanation of processes involves methods of reasoning with which a child cannot be expected to be familiar; and the object of the study is not to teach the theory of numbers, or to conduct the child to the contemplation of the *unum per se*, as Plato tells us, but to give the child the ability to reckon. Inspectors and examiners are too apt to question children as to the reason why they perform this or that operation, instead of contenting themselves with ascertaining whether they can do it. As a mental exercise, the explanation of processes is most valuable, but it belongs to a later period of the child's education. Facility and accuracy of work should first be aimed at.

In teaching arithmetic to children of elementary schools, concrete examples, that is examples dealing with measurements of actual things, should be preferred to calculations with abstract numbers.

Far too much time is often spent in complicated exercises in long division, in reducing complex fractions to simpler forms, and in finding the greatest common measure of two numbers. A child wants to learn as soon as possible to work out simple exercises on the length and area and contents of things, on weights and measures, and money values. And these exercises need not have reference to weights and measures which in our present system are seldom used. As far as possible, the child should be exercised on measurements which he can himself verify, or with which he is at least familiar. A footrule may be made to illustrate a number of useful exercises in arithmetic and is a piece of apparatus with which every child should be provided. Sets of weights and measures should, of course, be found in every schoolroom in which arithmetic is taught. The approximate verification of arithmetical examples by actual measurement is a most valuable exercise, as preliminary to Technical instruction. The realization of abstract calculations is most important at all stages of the pupil's progress. Again, short methods should always be encouraged, and approximate results should be accepted, the limit of the error being fully indicated. The time spent in obtaining accurate results involving fractions with several figures in the numerator and denominator might be more usefully employed in solving such questions as are likely to occur in actual practice. Indeed, much that is found in nearly all books on arithmetic, under the heading of 'vulgar fractions,' might be altogether omitted or postponed for more advanced instruction. On the other hand, an early introduction to decimal fractions is most serviceable, both as helping to explain our system of notation, and in familiarising the child, at an early age, with the kind of calculations he will afterwards have to make. When once familiar with decimal fractions, the pupil should be encouraged to employ them in all his calculations. As illustrating the application of decimals, the child should learn the metric system of weights and measures, a knowledge of which he is likely to require in his subsequent Technical work. The several measures should be found in the school for illustration, and should be used for verifying arithmetical exercises. Indeed no opportunity should be lost of quickening the intelligence of children, and of stimulating their observing faculties, by constantly directing their attention to actual things. It is the teaching through the medium of abstract ideas that fails to impress, and generally wearies the child. Technical education is essentially a *real* education, and as such its method is to teach through things to their properties and to the principles that connect these properties with one another. The study of the methods of Technical Education enables us to apply these methods with advantage to education generally. To no class of children is methodical instruction of so much moment as to those who are being educated in our elementary schools. If children continue their schooling to the age of 17 or 18, there is time to correct early mistakes. But in the case of children who leave school at the age of 12 or 13, every hour is of importance and should be fully utilised. In the teaching of arithmetic an excellent opportunity occurs of laying the foundation of a child's technical education. No subject of instruction lends itself so easily to the development of habits of accurate and exact thought, and to the training of the rudimentary reasoning faculties of the child. And this disciplinary value, the study of arithmetic may be made most readily to yield, by teaching the subject in connection with its practical applications.

(To be continued.)

Pestalozzi.

BY THE REV. CANON WARBURTON, M.A.,

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Prescribed for Certificate Examination, 1888.

CHAPTER I.

JOHN HENRY PESTALOZZI* was born as long ago as 1746, but he lived to be past eighty years of age, and many of those who knew him, and some of those who were taught by him, are still alive.

Quite apart from his reputation as a teacher he was a remarkable man, and his history is well worth studying and laying to heart; there is much in it to be admired—admired perhaps, rather than imitated; much to be avoided, perhaps, rather than to be condemned. He was not a very wise, certainly not a very practical man, but he had in him something of the Divine gift of Genius,—a heaven-sent conviction that he had found a new truth, and a passionate yearning, which no difficulty could deter or failure dishearten, to turn it to account for the benefit of mankind.

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* Pronounced Pest-a-lot-zy. He was, of course, a Swiss, but the name is of Italian origin, and in the Italian language the first of two 'z's' coming together is pronounced like a 't.'

His father, who had been a doctor, died when Pestalozzi was only six years old, and the boy was brought up in narrow circumstances, but still 'as a spoilt darling,' so he tells us, 'by one who was the best of mothers,' though too much absorbed in household cares to attend much to the development of her son's character. Many of the errors and weaknesses of his manhood are undoubtedly traceable to his want of masculine example and discipline as a boy; but, on the other hand, the tender affectionateness which he learned from his mother is the keynote of his life, and has coloured the whole system of education of which he was the originator.

Boyhood and Youth.

His birth-place was Zurich, the capital of the Swiss Canton of that name,—and there he went to school. 'In all school games,' he says, 'I was the clumsiest and most helpless of all the boys, yet always trying to excel them. They used to call me "Wonderful Harry from Foolstown." They liked me for my good nature, though they were always laughing at my awkwardness and thoughtlessness about everything that did not particularly interest me. Though one of the best of the scholars, my flightiness led me to commit faults of which the worst of them were never guilty. Generally seizing with quickness and accuracy upon the essentials of the subjects taught me, I was indifferent and careless as to the form and method. At the same time that I was far behind my classmates in some parts of my work, in others I surpassed them in a remarkable degree. The wish to be acquainted with some branches of knowledge that took possession of my heart and imagination, even though I neglected the best means of acquiring them and of exercising myself in them, was strong in me to enthusiasm; and it unfortunately happened that the tone of public culture in my native town was at this time eminently calculated to foster the ambition of taking an active interest in affairs long before one had had sufficient experience or training for such an attempt. Freedom, beneficence, self-sacrifice, and patriotism were the watchwords of our education; but the means of attaining to all this which was especially commended to us, namely, cultivation of the intellect, was left without that solid and efficient training of the practical ability which is the essential condition of its success. We imagined, whilst yet in the position of school-boys, that by a superficial school acquaintance with the great civil life of Greece and Rome, we should eminently prepare ourselves for the little civil life of a Swiss canton.'

In his holidays Pestalozzi frequently paid long visits to his uncle, the pastor of a rural village three miles from Zurich, where he became much attached to, and beloved by the country folk. A strong antagonism existed at this time in Switzerland between town and country, aristocracy and poor, and Pestalozzi took part, enthusiastically, as was his wont in everything, with the latter; and conceived a strong prejudice against the higher classes by whom he believed his humbler neighbours to be oppressed—a prejudice which largely, and, it must be added, injuriously, affected both his character and his career.

He had no sooner emerged from boyhood than he fell under the influence of the famous Jean Jacques Rousseau, whose ideal scheme of liberty, with its visionary speculations on philosophic education and its contempt for established scientific methods, had at this time taken hold of the imagination, and deeply tinged the ideas of the younger generation. Rousseau's educational treatise 'Emile' appeared when Pestalozzi was sixteen, and before long had run the round of all the European languages, and come to be regarded almost in the light of a new revelation. The young enthusiast found something which went straight to his own heart in Rousseau's fervid and tender love for humanity, in his sympathy with the sufferings of childhood, and his profound feeling of the political and social corruption of the times. No sooner had Pestalozzi read 'Emile' than the whole home and public education of the world at all previous times and in all ranks of society appeared to him as one gigantic blunder, which could be rectified only by the realization of Rousseau's ideas.

As yet, however, he had not awakened to a consciousness of his vocation and destiny as an educator of children. The first effect which the study of Rousseau produced upon his mind was to induce him to abandon the preparation, which he had already begun, for the clerical profession, in the hope that by devoting himself to jurisprudence he might find a career more adapted to produce for him a position in which he might exert an active influence on the social condition of his native land. One of his biographers, however, tells us that he abandoned theology because he broke down twice in his first sermon, and found himself incapable of committing even the Lord's Prayer accurately to memory.

Among the friends of his youth who exercised an influence in the formation of his ideas and character where the celebrated Lavater, of whom we shall hear again, and a gifted youth named Bluntschli, who died of consumption at an early age. In his last moments Bluntschli sent for Pestalozzi, and said to him, 'I am dying,—and when you are left to yourself you must not rush into any career which might be dangerous to you from your easy and confiding disposition. Try to find some quiet tranquil line of life; and unless you have by you a friend who will faithfully assist you, with a calm dispassionate knowledge of men and things, by no means embark in any undertaking whose failure would be disastrous for you.' Such was his friend's estimate of his character, but that no one knew its defects better than he did himself is sufficiently proved by the extract which follows from a love-letter to his betrothed, the beautiful and high-minded Anna Schulthess.

Courtship.

'Dearest Schulthess, those of my faults which appear to me the most important in relation to the situation which I may occupy in after-life are improvidence, flightiness, and want of presence of mind to meet unexpected emergencies. I cannot tell how far these faults may be diminished through my efforts to counteract them by calm judgment and experience. At present I have them still in such a degree that I dare not hide them from the maiden I love; they are defects, my dear one, which deserve your fullest consideration. I have other faults arising from irritability and sensitiveness which often refuse to submit to my judgment. I very frequently let myself run into excesses in praising and blaming, in likings and dislikings. Whenever my country or my friend is unhappy, I am myself unhappy. Direct your whole attention to this weakness; there are times when the cheerfulness and tranquillity of my soul will give way under it . . . Of my great and even culpable negligence in all matters of etiquette, I need not speak; any one can see all that at the first sight of me. I also owe to you the candid confession, my dear one, that I shall always consider my duties towards my beloved partner subordinate to my duties towards my country, and that though I shall be the tenderest of husbands, nevertheless, I hold it to be my duty to be inexorable to the tears of my wife, if she shall ever attempt to restrain me by them from the performance of my duty as a citizen. My wife shall be the confidante of my heart, the sharer of all my most secret counsels; a great and honest simplicity shall reign in my house. And one thing more: My whole heart is my country's; I will risk all to alleviate the need and the misery of my countrymen. What consequences may the undertakings to which I feel myself impelled draw after them! How unequal to them am I! and how imperative is my duty to show you the possibility of the great dangers they may bring upon me!

'Decide now for yourself, whether you can join your heart to a man with these faults and these prospects in life—and be happy. I love you so dearly from my heart, that this step has cost me much. I fear to lose you, my darling, when you see me as I am. I had often thought, "I will be silent"; but at last I have conquered myself, and I rejoice at what I have done.'

Bluntschli had scarcely been a month dead when Pestalozzi fell so dangerously ill that he was on the point of following his friend to the grave. His physician told him that he must give up all scientific study, and rest his brain. His sympathy with Rousseau's anti-scientific ideas made this abandonment of methodical study only too easy. He sold his books, burned his MSS., and betook himself to a farmer of considerable reputation, named Tschiffeli, in the Canton of Berne, and sought his instruction and advice as to the best means of realising his dreams for the amelioration of the condition of the poor. It was an unfortunate selection of a counsellor. 'I came to him,' says Pestalozzi, 'a political visionary, and left him an agricultural visionary, full of enthusiasm for my gigantic schemes fresh awakened by his plans, which, though difficult of execution, and in the main impracticable, were bold and original in conception.'

At Neuhof.

Tschiffeli had become famous by his plantations of madder, and Pestalozzi's first practical essay was in the cultivation of this plant. He induced a wealthy firm in Zurich to become partners with him in the purchase, for this object, of one hundred acres of chalky heathland on which he immediately proceeded to erect an Italian villa. To this house and estate he gave the name of *Neuhof, and there he settled at the age of twenty-four with his fair wife, Anna Schulthess, who had ventured, in spite of the warnings of the love-letter above quoted, to throw in her lot with his.

The madder plantation proved a failure. The Zurich firm which had advanced the money for the undertaking withdrew it at a sacrifice rather than risk the whole in such incompetent hands. Pestalozzi now found himself thrown upon his own resources, but with extraordinary courage, or extraordinary imprudence, he determined not only to go on with his agricultural speculations, but to combine with them a school for the gratuitous education of poor children. He drew up and made public a scheme for the establishment of this institution, and his plans and principles commanded such general approbation that, in spite of a growing distrust in his practical ability, he received offers of assistance from several of the principal towns of Switzerland. The 'Neuhof Poor School' opened in 1775, with fifty scholars. It was what we should now call an industrial school, for the children were to help out their expenses by their earnings, working in summer on the farm, and in winter at weaving, spinning, and other indoor occupations. The plan was a good one, and such a school has since then, many and many a time, proved almost self-supporting in competent hands, but it failed in those of Pestalozzi. Discipline never existed; the children would not work while they stayed with him, and ran off when they got new clothes, the civil authorities declining to interfere. These, however, were difficulties which time and patience might have overcome. The real cause of failure lay in the fact that Pestalozzi tried to carry out his experiment on a scale quite disproportioned to his skill, capital, and experience. It was an undertaking which required and presupposed a thorough knowledge of manufactures, men, and business, in which, to use his own words, he 'was deficient, in the same proportion as such knowledge was indispensable to him in the direction which he had given to his undertakings.' 'I who so entirely disapproved of hurrying on to the higher stages of instruction before a thorough foundation had been laid in the elementary stages, looking upon it as the fundamental error in the education of the day,—allowed myself to be carried away by illusions of the greater remunerativeness of the higher branches of industry, without knowing even remotely the means of teaching, or even of learning them,—and to commit the very faults in training up school children to spin and weave, which I so strongly reprobated and denounced, and which I considered dangerous to the domestic happiness of all classes.' There never was a clearer consciousness or a more candid confession of incapacity, but still he struggled on,—his noble wife assisting his endeavours,—determined to share his last crust with his children rather than turn them adrift. 'He lived like a beggar to teach beggars how men lived.' He laboured night and day to raise others from the misery into which he had himself fallen. At last, however, all was spent, and, in addition to that, he became deeply involved in debt; his own small fortune and his wife's considerable one had melted away. In 1780 the Neuhof School was closed, and Pestalozzi found himself in 'his elegant country house' all but penniless, with a wife whom trouble had thrown into a lingering illness,—and the wolf at the door. 'When my experiment went to wreck,' he writes, 'the blind confidence which people had reposed in me changed into just as inconsiderate a distrust. All belief in the qualifications which I really possessed was now lost, along with the belief in those which, in my self-deception, I gave myself credit for, but had not. My friends now only loved me without hope, and in the whole of the surrounding neighbourhood it was everywhere said that I was a lost man and that nothing could be done for me.'

(To be continued.)

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* Pronounced Noy-hofe.

How my School was Examined.

BY THE
MISTRESS OF A METROPOLITAN BOARD SCHOOL.

The object of the present paper is to present a statement, complete as far as possible, of the work given during the annual examination of a large school containing four hundred girls, and to offer such remarks on the mode of examination as may be serviceable to other teachers.

The first day was devoted chiefly to the examination of Standards I. and II. The following sums were dictated for Standard I.:—

1. 36
9
618
584
679

2. 306
195

3. Take 29 from 63.

Answers, 1926; 111; 34.

If two answers were correct the child passed; if only one was right, questions were asked in the tables and if these were readily answered a pass was secured.

The following words were dictated as a test in spelling:—

A. *Baby, at, licks, goes, paws, sharp, what, news, mice, flesh.*

B. We do not put salt in our *tea. Cakes, am, which, sons, food, wait, cooks, knife, fires.*

No child failed whose mistakes did not exceed four, and in the second set the last ten words alone were considered.

The following sentence had to be transcribed as a further exercise in writing: *This little flower is very common in our fields.*

The Reading was examined by small groups of a dozen children being taken apart from their class and heard to read from one of two books, Chambers' First Reader, or the New Holborn Reader for Standard I.

Two pieces had been prepared for recitation, *Little Dimple Chin,* and *Sunshine.* The Inspector chose six girls and told the Teacher to choose six to recite individually.

When each girl had said one or two verses, more girls were chosen in the same way until about two-thirds of the class had recited. The Inspector noticed particularly whether the aspirates and final letters were distinctly sounded, and a few girls were questioned on the meaning of the verse they had recited.

In Standard II. the order of the work was very similar to that of Standard I. The following sets of sums were dictated to the girls alternately classed as *A* and *B*:—

A. 1. Add together 68; 7,400; 9; 6,070; and 82,900.
2. Take forty-six from a thousand.
3. Divide 57,864 by 12
4. Divide 57,864 by 5.
5. Multiply 49 by 680.

B. 1. Take 642 from 15,005.
2. Divide 95,816 by 8.
3. Multiply 897 by 6,080.
4. Fred was born in 1879 and died in 1885. How old was he?

Answers, *A.* (1) 96,447; (2) 954; (3) 4,822; (4) 11,572 + 4; (5) 33,320.

B. (1) 14,363; (2) 11,977; (3) 5,453,760; (4) 6 years.

The following passages were first read over slowly, and then dictated a word or two at a time, the first by the class teacher and the second by the Inspector.

A. There was the coachman in front flourishing his long whip, and keeping a sharp look out, in case a sleepy carter was just around the corner with his cart in the middle of the road; and at the back of the coach was the guard in scarlet coat, blowing his bugle to clear the road.

B. A story is told of a soldier who had a favourite horse that never seemed so happy as when his master was on his back. At last in a fierce battle the soldier was killed, and fell from his horse. The faithful animal stood there for days.

The reading was tested in the same way as in Standard I., from the New Royal Reader No. II., and the New Holborn Reader No. II.

For recitation the girls had prepared 'Meddlesome Mattie,' and after they had recited a verse each, questions were asked such as the following:—Who was the writer? What is a man who writes poetry called? What is a lady who writes poetry called?

Standards III. and IV. were examined on the second day. In each of these standards cards were used for tests in arithmetic. The following is a sample card for Standard III.:—

1. Divide 6092 by 29.
2. Take £931 17s. 10d. from £6001 6s. 0½d.
3. John has 15s. 6d. a week, and spends 14s. 6d. a week, William has 14s. 6d. a week, and spends 12s. 9d. How much do they both save together?
4. How many baskets containing 45 apples each would it take to fill two boxes containing 270 in each?

Answers:—(1) 210 + 2; (2) £5069 8s. 2½d. (3) 2s. 9d.; (4) 12 baskets.

Other problems on the cards used were as follows:—

1. At a school treat 478 children had 9 oranges each, and there were 8 left. How many were there at first?
2. A horse and carriage cost £52 together; the carriage cost £32 16s. How much did the horse cost?
3. A father left his three children £1500 when he died. The eldest had £300; the second £250. What did the youngest have?
4. A gentleman bought a horse and carriage. The horse cost £29 17s. 6d. and the carriage cost £3 more than the horse. What was the cost of both together?

Answers:—(1) 4310. (2) £19 4s. (3) £950. (4) £62 15s.

As Standards III. and IV. were intermingled, only one passage was given to each for dictation. That for Standard III. was read over and dictated by H. M. Inspector, and ran as follows:—

The morrow came. Giles was up with the dawn. He had got his plough ready when one of his friends came to invite him to a birthday feast. Giles hesitated at first, but on reflection he said to himself, 'One day later will not matter,' and so he went to his friend's feast.

The Reading was examined from three reading books,—The New Royal No. III., The New Holborn No. III., and the Holborn Historical No. I.

The exercise in Grammar was to select all the Nouns, Verbs, Adjectives, Personal Pronouns, and Adverbs, from the passage dictated.

The girls in this standard recited the poem 'Which shall it be?' and the Inspector asked simple questions on the meaning.

The Arithmetic of Standard IV. is exemplified by the following cards:—

A. 1. Divide £145 15s. 6d. by 56.
2. Reduce 36 poles, 15 yards, to square inches.
3. Multiply £37 17s. 3d. by 67.
4. How much will it cost to lay a length of 5 poles, 3 yds. of piping at 1d. per inch?

B. 1. A boy earns 4s. 9d. a week. How much does he earn in a year?
2. Divide £3780 9s. 10$\frac{1}{2}$d. into 706 equal parts.
3. Bring 807,054 square feet to acres.
4. A man worked 9 hours a day for 4$\frac{3}{4}$d. an hour. At the end of the time he received £53 8s. 9d. How many days had he worked?

Answers.—*A.* (1) £2 12s. 0$\frac{3}{4}$d. (2) 1,430,784 sq. in. (3) £2536 15s. 9d. (4) £4 11s. 6d.

B. (1) £12 7s. (2) £5 7s. 1d. + $\frac{433}{706}$f. (3) 18 ac. 2 r. 4 p. 11 yds. 6 sq. ft.. (4) 300 days.

The following passage for dictation was read out and dictated by the teacher:—

Two boys were apprenticed in a carpenter's shop. One determined to make himself a thorough workman, the other 'didn't care.' One read and studied and got books that would help him to understand the principles of his trade. He spent his evenings at home reading. His companion liked to go with other boys to have a 'good game.' 'Come,' he often said to his shopmate, 'leave your old books; come with us. What's the use of all this reading?'

The Reading was examined by hearing the girls read round in a large class from the New Royal Reader No. IV., the Holborn No. IV., and the Holborn Historical Reader No. II. In some cases two girls standing next each other had to read the same passage simultaneously.

The passage for recitation was 'The Fall of Wolsey' from Shakespeare's 'Henry the Eighth.' In hearing this the Inspector, after calling on the back row of girls to stand up, heard a few girls individually and then together. Then he asked a few questions such as—Who wrote this piece? From what work is it taken? In whose reign did the author live? Each girl as she answered was told to sit down. The other rows were dealt with in like manner, and at last a group were called on to recite simultaneously. The children were also asked to mention short passages suitable for quotation or writing in a friend's album.

As an exercise in Grammar the following sentence was given for parsing: 'They rushed in a panic out of their tents and fled away.'

In Standards III. and IV. the Grammar exercise was taken on paper; but the Inspector gave the teachers the option of having it done orally.

The work of Standards V., VI., and VII. was commenced on the first day of the examination, when Arithmetical cards were used, and exercises given in Composition and Dictation.

Standard V. cards:—*A.* 1. Make a bill for the following, 12 lbs. of sugar at 2$\frac{1}{2}$d. per lb.; 4 lbs. tea at 2s. 6d. per lb.; 6 lbs. raisins at 5$\frac{1}{4}$d. per lb.; 8 lbs. currants at £2 2s. per cwt.
2. If I pay £7 11s. 8d. for 7 chairs, what would 4 cost me?
3. $\frac{4}{5} + \frac{2}{3} + \frac{1}{2}$.
4. Find the difference between 1,508 articles at £1 1s. 10d. and the same number at £1 each.

B. 1. Add $\frac{1}{3}$, $\frac{1}{5}$, $\frac{3}{8}$.
2. Make a bill for the following:—10$\frac{1}{2}$ lbs. biscuits at 8$\frac{1}{2}$d. per lb.; 32 Bath buns at 8 for 7$\frac{1}{2}$d.; 19 loaves at 11$\frac{1}{2}$d. each; 9$\frac{1}{4}$ lbs. biscuits at 1s. 5d. per lb.
3. What would a man get for 207 days, if his daily wages are 5s. 7$\frac{1}{2}$d.?
4. If 8 acres produce 226 bushels how many bushels will 2 acres 3 roods produce?

C. 1. Take $\frac{2}{5}$ from the sum of $\frac{1}{4}$ and $\frac{5}{8}$.
2. 676 articles at £7 18s. 10$\frac{1}{2}$d. each.
3. Make a bill for the following:—53 yds. silk at 3s. 9d. per yd.; 150 balls cotton at 2s. 3d. per dozen; 11$\frac{1}{2}$ yds. flannel at 1s. 5d. per yd.; 29 yds. edging at 2$\frac{1}{4}$d. per yd.
4. If I can buy 204 apples for 11s. 4d., how many can I buy for 1$\frac{1}{2}$ guineas?

D. 1. $\frac{9}{10} - \frac{2}{7}$.
2. If 7 men can mow a field in 5$\frac{1}{2}$ days, how long would it take 11 men to do the same amount of work?
3. Find the rent of 17 acres 15 poles at £3 3s. per acre.
4. Make a bill for the following:— 15 quires paper at 6$\frac{1}{2}$d. per quire; 225 envelopes at 25 for 3$\frac{1}{2}$d.; 7 galls. 2 qts. ink at 1s. 9d. per gall.; 18 boxes pens at 1s. 5d. per box.

Answers.—*A.* (1) 18s. 1$\frac{1}{2}$d. (2) £4 6s. 8d. (3) 1$\frac{29}{30}$. (4) £138 4s. 8d.

B. (1) $\frac{109}{120}$. (2) £2 2s. 3d. (3) £46 19s. 4$\frac{1}{2}$d. (4) 77$\frac{11}{16}$ bush.

C. (1) $\frac{19}{40}$. (2) £5,369 19s. 6d. (3) £12 8s. 7$\frac{1}{4}$d. (4) 567 apples.

D. (1) $\frac{33}{70}$. (2) 3$\frac{1}{2}$ days. (3) £53 16s. 10$\frac{7}{8}$d. (4) £2 9s. 4$\frac{1}{2}$d.

Half the girls in Standard V. wrote the following extract which was dictated by the teacher, while the other half had to reproduce a short story slowly read twice also by the teacher:—

Dictation.—'Following with wonderful promptitude the direction of Ivanhoe and availing herself of the protection of the lower part of the window, Rebecca, with tolerable security to herself, could witness part of what was passing without the castle and report to Ivanhoe the preparations which the assailants were making for the storm. Indeed the situation which she thus obtained was peculiarly favourable for this purpose.'

The story for Composition was the following:—

A DINNER PARTY.

Some years ago it became common, and was even thought a mark of politeness, for guests invited to a party to arrive an hour, or sometimes two hours, later than the time mentioned in the invitation. A gentleman, feeling much annoyed by such lack of punctuality, and wishing to show how much he disapproved of this inconvenient fashion, invited his friends to a dinner party, and stated on the invitation cards that it was to commence at five o'clock. Only one guest arrived at the appointed hour, and he and the host at once sat down to dinner. At six o'clock some more people arrived, but they had to be content with such dishes as had not been already served. Those who considered themselves most polite came at seven o'clock, but instead of the dinner they expected, they were served with coffee only.

The Reading in Standard V. was limited to one of the three books, namely, the Fifth Royal Reader, and the questions on the matter referred especially to the places mentioned.

For Recitation this standard had prepared the Trial Scene from the 'Merchant of Venice,' and the Inspector taking a few girls at a time required each to repeat one speech in order, and after each had said her portion, the remainder was repeated by the whole class simultaneously. Simple questions on the meaning were directed to the class as a whole, the girls who could answer raising their hands and answering as called upon.

At a later stage of the examination Grammar was tested by oral questioning on passages from the literature which had been recited.

Cards given for Standard VI.

A. 1. If 3 tons 11 cwts. 3 qrs. cost £11 1s. 8d., what will be the cost of 5 tons 12 cwts. 3 qrs.?

2. Find the Simple Interest on £214 10s. for 6 years at 5 per cent. per annum.

3. Find the value of $\frac{3}{8}$ of $\frac{2\frac{3}{4}}{1\frac{3}{8}}$ of 1s. 4d.

4. If on one yard I gain 1·65 shillings, what shall I gain on 96·25 yards?

B. 1. Find the Simple Interest on £168 3s. 4d. at $2\frac{1}{4}$ per cent. per annum for 10 years.

2. Reduce $\frac{3}{5}$ of $\frac{5}{9}$ of $\frac{4}{13}$ of 11 to a simple fraction.

3. A man begins at 7 o'clock in the morning, and walks 31 miles $7\frac{1}{2}$ furlongs. He walks $3\frac{3}{4}$ miles an hour. At what time in the afternoon will he finish his journey?

4. A book cost ·15 of 5s., what would 12 copies cost?

C. 1. What sum of money should be paid at the end of 1·5 years on £56 10s. allowing interest at 3·5 per cent. per annum?

2. If 54 men can do a piece of work in 14 days, how long will 76 men be doing it?

3. Find the value of $\frac{6}{17}$ of $6\frac{4}{5}$ of £6 13s. 4d.

4. If I spent $\frac{4}{15}$ of $\frac{5}{12}$ of $\frac{3}{7}$ of my money and had £5 left, how much did the whole amount to?

D. 1. How often is $\frac{7}{10} - \frac{3}{5}$ contained in $\frac{7}{12} + 3\frac{1}{8}$?

2. Find the Simple Interest on £185 for 9 months at $3\frac{1}{2}$ per cent. per annum.

3. If I can mow $1\frac{1}{8}$ acres in $2\frac{1}{3}$ hours, how long will it take me to mow 3 roods (answer in hours, mins., secs.)

4. If for ready money a bill of £15 was reduced to £14, what could be saved on a bill of £5 by paying ready money?

Answers.—*A.* (1) £17 8s. 4d. (2) £64 7s. (3) 1s. (4) £7 18s. $9\frac{3}{4}$d.

B. (1) £37 16s. 9d. (2) $\frac{44}{45}$. (3) 3.31 p.m (4) 9s.

C. (1) £59 9s. $3\frac{9}{10}$d. (2) $9\frac{18}{19}$ days. (3) £16. (4) £5 5s.

D. (1) $37\frac{1}{12}$. (2) £4 17s. $1\frac{1}{2}$d. (3) 1 hr. 33 m. 20 s. (4) 6s. 8d.

The Composition exercise in Standard VI. was:—

Write a letter to a friend on

(*a*) A Washing Day at Home.
(*b*) An Old Sword.
or (*c*) A Ride on a Tram-car.

Arithmetical Tests for Standard VII.

A. 1. In a class of 18 girls, 7 are 19 years of age, 4 are 18 years old, 3 are 17 years old, and the remainder 16 years. Find their average age.

2. If 16 men can mow 152 acres in 8 days, how many men can mow 228 acres in 12 days?

3. A man sells 148 cwts. of sugar for £120 17s. 4d. at a gain of $16\frac{2}{3}$ per cent. What was the cost price per cwt.?

4. What principal will gain £$18\frac{3}{4}$ in three years at $2\frac{1}{2}$ per cent. per annum?

B. 1. Express $\frac{3}{7}$ of $1\frac{17}{60}$ of 2s. 6d. + $\frac{2}{9}$ of $\frac{11}{26}$ of $\frac{39}{55}$ of £1 5s. as the fraction 6s. 1d.

2. Find the average of 24, 13·8, $\frac{2}{7}$, 0, $\frac{2}{5}$.

3. If ·26 of a piece of work cost £2 5s. at the rate of $7\frac{1}{2}$d. per hour, what would ·39 of it cost at the rate of 9d. per hour?

4. If a horse is bought for £80 and sold for 80 guineas, find the gain per cent.

C. 1. A man was allowed 6 per cent. for collecting taxes. One day he earned 5s. What did he collect?

2. A can do a piece of work in 4 days, B can do it in 5 days, C in 6 days. In what time will they do it working together?

3. If 56 men can live on £120 for 3 weeks, how long can 7 men live on £280?

4. In a class of 24 children, 12 were 8 years of age, 9 were 7, and the rest were 10. Find the average age.

Answers:—*A.* (1) $17\frac{7}{9}$ yrs. (2) 16 men. (3) 14s. (4) £250. *B.* (1) $\frac{1}{2}$. (2) $7\frac{366}{525}$. (3) £4 1s. (4) 5 per cent. *C.* (1) £4 3s. 4d. (2) $1\frac{23}{37}$ days. (3) 56 weeks. (4) $7\frac{7}{8}$ yrs.

The exercise in Composition was an essay on one of the following subjects:—

(*a*) Flowers of the Field.
(*b*) Flowers and Insects as Friends to Man.
(*c*) The Electric Telegraph.

The Reading for Standards VI. and VII. was taken from the Sixth Royal Star Reader, and the mode of examining was the same as in Standard V. The same remark applies to the Literature and Grammar, the piece selected being a scene from 'As You Like It.'

During part of the first day girls belonging to Standards V., VI., VII., were examined in Stage I. of Domestic Economy, the questions being as follows:—

1. What foods contain the following substances and to what classes of food do they belong? Starch, sugar, fat, gluten, albumen, casein.

2. How is the heat of the body kept uniform in change of climate? What are the chief components of starch, sugar, alcohol, cheese, and milk?

3. What do you think of cheese as an article of diet? To what persons is it best suited?

4. How is the health of the body promoted by the washing of our under-clothing, our skin, our hair, our teeth?

The work already described occupied the first three days of the examination. The fourth was devoted to singing, drill, needlework, and general inspection, including a thorough over-hauling of the Log-Book and Registers.

The songs heard by the Inspector were—in the lowest division—Standard I.—'Happy, happy children we,' and 'The Bells'; in the next division—Standards II. and III.—'We hail the Winter King'; and in the upper division—Standards IV. to VII.—'Children's Voices,' solo and chorus, and 'The Hounds are out.' For the latter division exercises were set on the blackboard in time, in minor mode, and in transition in the tonic sol-fa notation. Individual children were called out to beat time to exercises, and to follow and sing separately a voluntary pointed on the modulator

For the needlework examination the last six or eight names on the schedule in each Standard were selected by the Inspector, and about an equal number of others by the teacher, and each of the girls thus chosen had to work one of the tests appointed in the government regulations.

Every test mentioned in the regulations was exemplified in the specimens worked. The appointed time, 45 minutes, was strictly adhered to; and when they were finished the pieces were sealed up and taken away for examination.

The drill, which consisted of extension motions, marching, countermarching, and formation of companies, was conducted by the Drill Sergeant in the presence of the Inspector.

Knitting Maps.

BY MRS. J. D. HARRIS.

Lady's Crossover.

This pattern is remarkably well fitting and comfortable.

2 Bone pins. No. 10 Chamber's bell gauge.

4 oz. of Berlin fingering.

Cast on 12 stitches, knit 1 plain row.

A.* Knit 3. Make a stitch (by raising a loop and knitting it). Knit 9, make a stitch. Knit 3.

Knit the reverse row.

Repeat from A till you have 80 stitches.

B. Knit 3 plain rows.

C. Increase as at A twice, knitting 3 rows between, 84 stitches in all.

For the Neck.

D. Knit 37.

E. Cast off 10.

F. Knit 37.

Knit these last 37 stiches backwards and forwards for 3 inches (leaving the first 37 on the pin).

For Front of Neck.

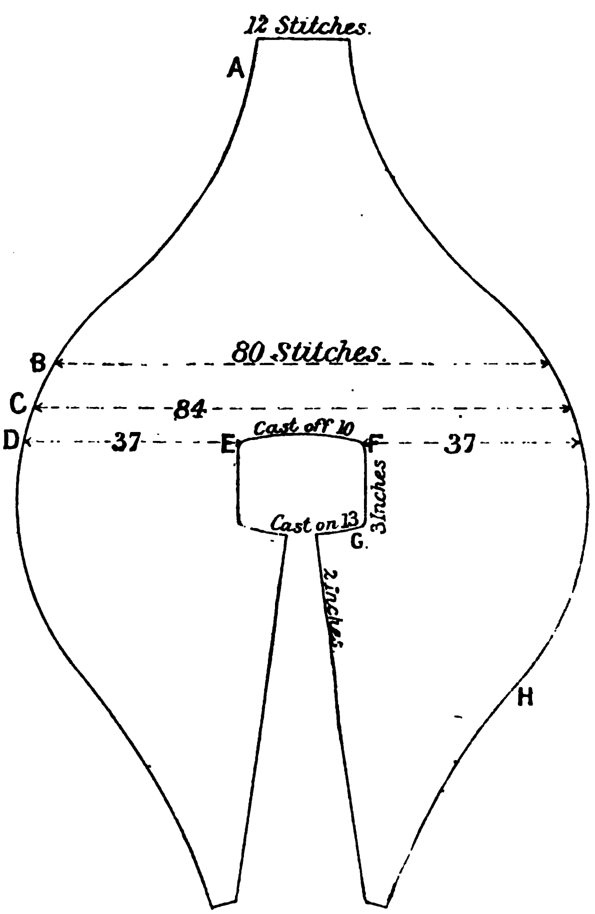
G. Knit 37. Cast on over your thumb 13. Knit plain 2 inches more.

To Decrease the Fronts.

H.* Knit 3. Knit 2 together.

Repeat at H till all the stitches are taken off.

The other side is of course exactly the same. A border should be crotcheted round, and ribbon or cord and tassels added at the neck and waist.



Notes of a Lesson on the Size and Exact Shape of the Earth.

BY JOSEPH H. COWHAM, F.G.S.,

Lecturer on School Method: Westminster Training College.

MATTER, INCLUDING EXAMPLES AND TRUTHS THEY TEACH.

A. The Earth when compared with any other object near us is a very large body.

1. This is inferred from the fact that the curvature of the Earth is so slight that for many centuries the Earth was held to have a flat surface.

In Fig. 1 an observer at A would notice a much flatter surface from D to E on the portion of the large circle than from C to B on the small circle.

2. The same truth is known from the vast extent of the continents and oceans which cover the Earth's surface.

(*a*) The land area is about 52,000,000 square miles.

(*b*) The water surface covers nearly 150,000,000 square miles.

B. How the size of the Earth has been measured.

(*a*) Simple truths about circles.

1. In our last lesson it was shown '**that the Earth is round.**'

This statement is not absolutely correct as will be shown later on in this lesson.

2. A line drawn round it through the two poles would be a circle.* This circle is equal to **the circumference of the sphere.**

It coincides with a meridian. The equator is a similar circle drawn midway between the poles.

3. Every circle is divided into 360 degrees. If then we can determine the length of one degree on the Earth's circumference we can find the length of the entire circumference by simply **multiplying the length of one degree by 360.**

ILLUSTRATIONS AND TEACHING HINTS.

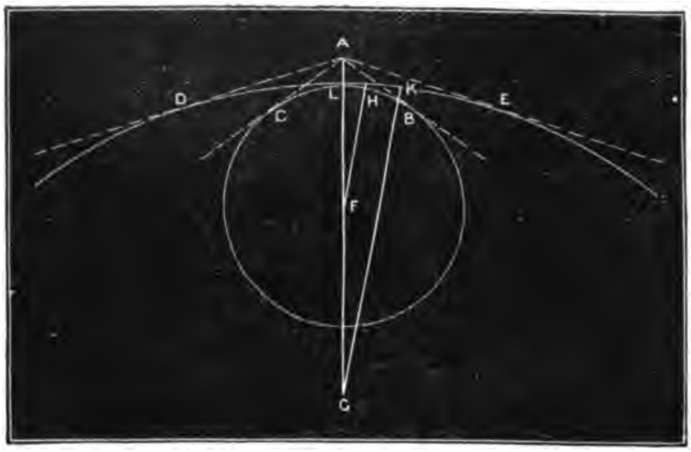


Fig. 1. Two circles to show that the larger the circle the flatter is the curve.

There are men who still hold that the Earth is flat. The famous experiment of Mr. Wallace on Bedford Level, 1870, illustrated in the lesson last month, was made to disprove the 'flat earth theory.'

2. Show on a map of the world the distribution of land and water, and state :—

(1) That the total land area is about 52 millions square miles, whilst England has about 50 thousand square miles.

(2) It would take a thousand areas equal to England to cover the entire land surface.

(3) The water covers nearly three times the surface covered by the land.

1. Revise the evidence of the Earth's rotundity given in the lesson last month. This will serve to fix the matter then taught.

2. Draw a line round a globe so as to divide it into two halves, and ask the class to name it; afterwards they may name a line supposed to be similarly drawn round the Earth.

Show in this way that any circle—meridians, equator, and ecliptic—which divides the globe into two halves is equal to the Earth's circumference.

3. This division of any circle will be familiar to all who have studied practical geometry. To others it must be explained.

The calculation necessary for finding the length of the entire circumference is a simple problem and should be stated by the class.

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* This statement does not take into account the slight flattening of the Earth at the poles.

(*b*) How to find the length of a degree on the Earth's circumference.

1. A line is measured carefully on a flat surface some miles in length.

British surveyors did this along the shores of Lough Foyle in the north of Ireland and obtained a line about 7 miles in length. **This line is called a Base line.**

See the line AB Fig. 2.

2. **Surveyors proceed to each end of this base line and by means of an instrument called a Theodolite they first look along the line BC to the church spire C and thus obtain the angle ABC; they then look along the line AC to the same spire and obtain the angle BAC.**

With the base line thus accurately measured and the two angles ABC, BAC observed, the remaining sides BC and AC can be calculated without further measurement.

3. From the three stations A, B, and C, whose distances apart are now known, the surveyors, proceed to observe other prominent objects, *e.g.*, D and E, in Fig. 3, and to calculate their distances. These again become starting points for further operations until the entire kingdom is covered by a series of triangles and the absolute distance between every station is determined.

The distance between two places north and south of each other, such as Edinburgh and Greenwich, is in this way accurately obtained, **about 315 miles.**

4. To find the number of degrees between Edinburgh and Greenwich.

(*a*) Take the angle between the zenith of Edinburgh and the North Pole.

(*b*) Similarly the angle between the zenith of Greenwich and the North Pole.

(*c*) The difference between the number of degrees observed at the two places will give the number of degrees between them on the Earth's surface.

1. Refer to a land chain and how it is used in surveying—

This mode of measuring is not sufficiently exact, hence long bars of iron were used and allowance made for alterations in length due to change of temperature.

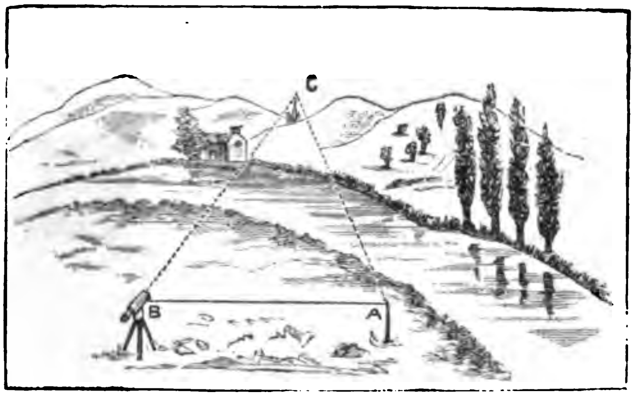

Fig. 2. Mode of observing angles by means of the Theodolite.*

2. **This must be told; if a Theodolite be shown and examined, and its use determined by actual observations, a very much better insight will be obtained by the class into the mode of surveying here described.**

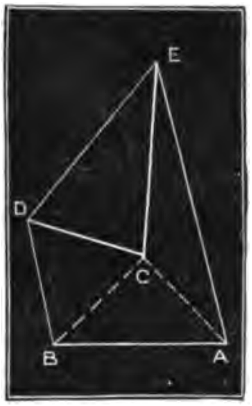

Fig. 3 represents the mode ot extending observations to the new stations D and E., and thus obtaining the lengths ot the lines proceeding from the triangle BCA to D and B respectively.

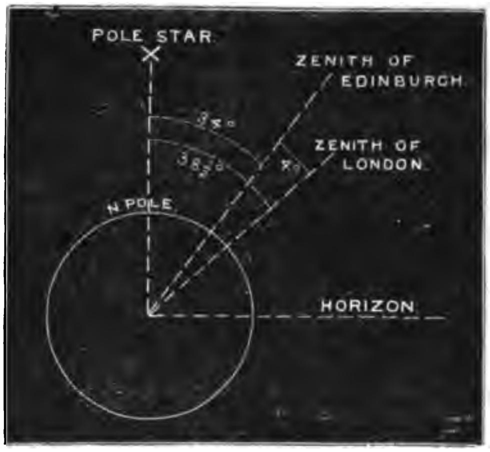

Fig. 4 represents the zenith distance ot the pole from Edinburgh and Greenwich respectively, viz., 34° and 38½°, and also the number of degrees between the two places on the Earth's surface, viz., 4½°.

The horizon is that observed from the North Pole.

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* Suggested by Guilleman in his admirable work 'The Heavens.'

5. To find the length of a degree and the size of the Earth.

(*a*) Divide the number of miles between Edinburgh and Greenwich by the number of degrees between the two places. The result is **the length of one degree.**

(*b*) Multiply the length of one degree by 360 and the result is the length of the Earth's circumference.

The exact shape of the Earth.

(*a*) Surveyors when they measure degrees in high latitudes find they are larger there than degrees measured near the equator.

(*b*) Now if Fig. 5 be examined it will be seen that whilst the angle LFH is exactly equal to the angle LGK the portion LH of the smaller circle is much shorter than LK on the larger circle. **Hence degrees on the larger circle are much longer than on the smaller circle.**

(*c*) We have already seen that the appearance of a curved surface becomes flatter the larger the sphere upon which the curve is drawn. In this way the lengthening of the degree as we approach the poles explains what we mean when we say **the Earth is flattened at the poles.**

Inference:—

The Earth is not a perfect sphere. It is a spheroid.

The Polar Diameter is **7899½ miles** long.

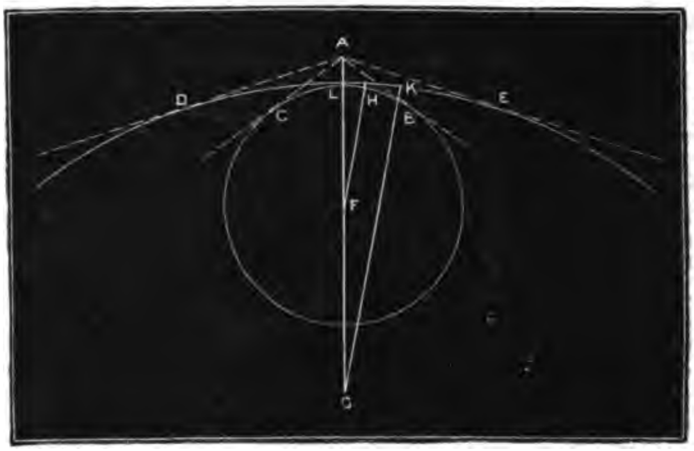
The Equatorial Diameter is **7926½ miles** in length.

The difference is about **27 miles.**

The number of degrees is shown in Fig. 4. The number of miles in a straight line is about 315—

$$\therefore \frac{315}{4\frac{1}{2}} = 70 \text{ miles.}$$

This calculation gives a little over 25,000 miles as the earth's circumference. The apparent error will be corrected in the next stage.



(*a & b*). Fig. 5 is intended to show that the curve is flatter when the degree is increased in length.

Draw FH and GK from the centres of the two circles and parallel to each other. The angles at F and G will then be equal in size. It is now apparent that LK is flatter than LH.

(*c*) Allow the class as far as possible to make the connection between the lengthened degree in the higher latitudes and the flattening of these regions:—The flattening is not apparent to our senses, and must be reasoned from the data given in *a* and *b*.

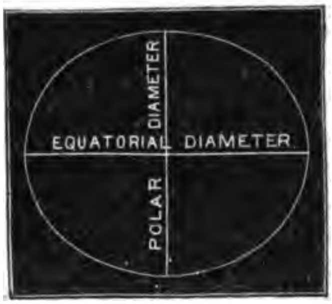


Fig. 6. The Earth as a spheroid. It is well to remind the class that the difference between the two diameters is very slight.

'In a globe 2 ft. 6 in. diameter the difference is very little more than $\frac{1}{10}$ of an inch.'

BLACKBOARD SKETCH.

1. The earth is a very large object—
    This is shown—(1) By the slight curve of that portion of the surface we see.
    (2) By the known amount of land and water surface.
2. Every circle is divided into 360°.
    When the length of a degree is known, the length of the circumference is found by multiplying the length of one degree by 360.
3. To find the length of a degree on the earth's surface:—
    (*a*) Measure a 'Base line.'
    (*b*) Find the distance between Edinburgh and Greenwich = 315 miles.
    (*c*) Find the number of degrees between them = 4½°
    (*d*) Divide 315 miles by 4½ for length of one degree = 70 miles.
4. Degrees are not all the same length. Those measured near the poles are longer than those near the equator.
5. Hence we infer that the earth is flattened near the poles.

How to teach the Babies.

BY JAMES BAILEY.

Head Master of Southlands Training College.

CHAPTER XII.

'APPROPRIATE OCCUPATIONS.'—THE KINDERGARTEN.

IN the 'Revised Code' for the year 1883 it was enjoined as one of the conditions on which the award of the 'Merit Grant' to infant schools should be based, that provision should be made for 'appropriate and varied occupations.' In the 'Instructions to Her Majesty's Inspectors,' issued at the same time, it was observed in reference to this requirement that 'the Code assumes that a good infant school should provide . . . a proper variety of physical exercises and interesting employments.' As to these employments the further remark is made: 'It should be borne in mind that it is of little service to adopt the "gifts" and mechanical occupations of the Kindergarten unless they are so used as to furnish real training in accuracy of hand and eye, in intelligence and in obedience.'

The characteristics of child life which render appropriate to its training the provision here insisted on, have been set forth in some of the early papers of this series. The official recognition of these requirements of infant teaching has already borne excellent fruit in the improved condition of a large proportion of the infant schools in Great Britain. The reports of Her Majesty's Inspectors, of recent years, bear ample testimony to this improvement. The dull and dreary monotony which marked the daily work of many infant schools and classes has been agreeably broken, for both scholars and teachers, by the substitution, for much profitless *talk*, of ever welcome *action*. It has stimulated the ingenuity, and brightened the work of many good teachers, and has quickened some who were dull. It is, of course, quite clear that even this good method may degenerate into a spiritless and mechanical process, or that the children furnished with the material, but left unguided by their teacher, may pass the time in merely playing with toys. That, however, is not the fault of the system; it could only happen through the fault of the teachers. No conceivable mode of school teaching is free from such a sad possibility. This at least may be said of it, that imperfectly taught and ill-conditioned infant classes can hardly be made worse, but much more probably will be much improved by the employment of 'occupations' which are appropriate and varied,' and, that teaching which without it has been good, is certain to be made better by its adoption.

The principle which underlies this feature of educational training largely guided Fröbel in his conception and development of the Kindergarten. And a consideration of this part of our subject necessitates some detailed reference to his work. Much interest was awakened by the introduction of the Kindergarten system of teaching to the notice of English educators more than thirty years ago. One of the damaging effects of the Revised Code, on English school work, was to check, almost indeed to stifle, the incorporation into infant school teaching of some parts of that system which was just being attempted. For some years past, however, attention has again been directed to it, and now no infant school equipment is considered complete, and no infant teacher fully qualified for her work, without more or less recognition of its claims.

Dr. Fitch, in the chapter on 'Preparatory Training,' of his 'Lectures on Teaching,' sets forth briefly, but with his customary clearness and force, what appears to be the true place of the Kindergarten in infant training. Speaking of 'the necessity for more definite and intentional training of the senses which had been insisted on with much earnestness by Pestalozzi, by Rousseau, and by George Combe,' he says, 'it is to Fröbel that we owe the clearest recognition of the main principle, and the most systematic effort to reduce that principle to practical application. . . . Fröbel devised a series of exercises for young children beginning at the age of three or four. He knew that the first things children want to do are to see, to handle, to move about, and to exercise their senses, and he sought to arrange a set of simple and appropriate employments, with a conscious educational purpose, and in careful obedience to the suggestions of Nature.' After referring to some of the manual exercises and organized games so carefully devised by Fröbel, Dr. Fitch goes on to say: 'There is no doubt that the system in the hands of bright and sympathetic teachers has many very substantial advantages,' not the least of which is, that 'Fröbel's method certainly increases the happiness of little children.' It enables their teacher to relieve their school time of the weariness of ordinary forms of instruction to them, to keep them under discipline without tiring and overstraining them with lessons, and to make learning pleasant to them. The little gifts and exercises of Fröbel, judiciously employed, 'absorb the attention and powers of the little ones without giving them any sense of fatigue. Infants learn obedience, fixed attention, accuracy of eye, steadiness of hand: they learn to count and to know the nature of colour, and of form. They are exercised in imitation, in invention, and in the elements of drawing and design. And all these lessons are learned in the best of all ways: without being considered as lessons; not indeed in the shape of lessons at all, but rather as so much play. They are in fact organised play, with a conscious and direct educational purpose. But this purpose is not obtruded before the children, who think that they are being amused, when in fact they are being systematically taught. Experience shows that children who have been disciplined on this system are found (1) to have got the rudiments of writing, counting, and drawing, and to be better prepared for the ordinary subjects of school instruction than others; and (2) to have obtained in an indirect way a good deal of useful training, which shows itself in quickened sensibility, and prompter intelligence.'

Now a recognition of such advantages as these may well account for the eager welcome given to the Kindergarten, by those interested in the training of little children, and may even prepare us for the exaggerated estimate of its value formed by many, especially by educational theorists. We must not, however, expect too much from it; particularly it must be borne in mind that its value depends on the manner in which its methods and appliances are used in the daily instruction and training of the children.

Some wholesome cautions are given by Dr. Fitch, both as to the personal requirements of the teacher, and the limits within which the Kindergarten can be usefully employed in ordinary schoolwork.

On the one hand, special aptitude and enthusiasm on the part of the teacher are necessary to make the best of the system. 'In the hands of spiritless teachers, who look on it merely as a system which anybody can adopt, and who just seek to carry out the methods in a book of diagrams and patterns which describes Fröbel's gifts and games in regular sequence, the results will be very poor.' It is further pointed out that 'joyousness of nature, versatility and sympathy, and unusual power of telling a story, are indispensable in the teacher if the system is to have its proper effect.'

On the other hand, we are warned against the fault to which 'the opposite kind of teachers, the most sympathetic and enthusiastic, are specially prone; and that is to make too much of the system and to expect from it more than it can do.' The Fröbel exercises are a valuable element in the school life, but they must not be made the whole of it. Children must not be kept at it exclusively, or too long at a time. Means must not be mistaken for ends. The training of eye and hand, which these exercises so greatly aid, must be early applied to reading and drawing and other useful purposes as soon and as continuously as the children can bear it. It must be used as an auxiliary to the graver employments of the school, but must not be allowed to supersede them. In no other way can the children be rightly prepared for the serious work of school, or of after life.

The teacher who has not received practical instruction in Kindergarten work should study with care one of the manuals devoted to the exposition of the Kindergarten system, and from the gifts, or apparatus, and exercises therein described, make a selection of those best adapted for her special requirements. Nothing beyond a very general indication of these can be attempted here. For the Babies' Class, what are known as Gifts I., II., III., and IV., furnish a source, when judiciously handled, from which a large variety of most useful and interesting occupations can be secured. The manual exercises with the balls, singly or combined; the observation of their colours and motions; the twisting and unwinding of the strings from which they are suspended; the comparisons between the soft and the wooden ball; between the ball, the cylinder, and the sphere; the placing them in different positions; the building with the wooden cubes; the opening, emptying, and refilling of the boxes; the illustrations of number, of form, of colour, of motion, of position, may be made to furnish a very large amount of happy and well-directed employment for little children. After this, or in connection with it, will come the placing of coloured pieces of cardboard of various forms, in imitation of the pattern formed by the teacher; also the use of laths, or sticks of suitable size, similarly dealt with. A surprising amount of pretty and useful work can be done with this simple apparatus, when directed by the ingenuity and skill of a well qualified teacher.

Paper folding, of the simpler kind, the stringing of various coloured beads, the sorting of coloured marbles, pieces of paper, ribbons, or strings, and shreds of wool, the placing together in heaps, of sticks or strings of the same length, or of the same number, are other engagements equally interesting and equally suitable. A very simple device by which children too young to use the pencil for drawing may be made to construct forms, after the teacher's pattern, is that of giving each one a piece of string, to be laid upon the slate or desk, and pushed by the pencil into the required form. Indeed, a most notable feature of this part of a good teacher's work is the constant addition it is ever receiving, through fresh applications of the old modes to new apparatus, or through modifications of method and of appliances, due to the continual quickening of the teacher's observation and ingenuity as experience widens.

Closely connected with the children's occupations, are their physical exercises, or drill, their marching, and their games of recreation. These, of course, must all be carefully adapted to the physical capacities and power of the children, in their simplicity and ease of movement, and in the freedom from too exacting requirements of precision and smartness. They must be of such a kind and be so conducted as that the little ones shall engage in them with a thorough sense of hearty enjoyment. The simultaneousness of movement in sitting, standing, marching, singing, playing, movements of limbs, &c., gives them a great charm to the children, and they may then not only conduce to their happiness, but be made a means of valuable disciplinary training. Care must be taken, too, that they shall neither place too great a strain on any part of the body, nor leave any part without its appropriate exercise.

In suitable weather, exercise and recreation, never without the due supervision of the teacher, should be systematically taken in the open air. If there be no playground, or if it be otherwise expedient, exercise should be regularly taken in the classroom, where, as in every infant schoolroom, there should be sufficient unoccupied space for marching and games of movement. In the complete Kindergarten manuals will be found a variety of suitable and very pretty games, accompanied by music, and well adapted to promote good muscular exercise.

(To be continued.)

Quarterly Arithmetical Tests.

Standard I.—First Quarter.

1.
52
607
4
83
9

2.
790
250

3.
468
132

4.
10 × 2;
7 × 3;
3 × 4.

Second Quarter.

1.
6
370
5
912
48

2.
153
7

3.
619
546

4.
12 × 3;
5 × 4;
11 × 6.

THIRD QUARTER.

1. 534
1
809
67
295

2. 320
185

3. 903
94

4. 4 × 4;
9 × 5;
8 × 6.

STANDARD II.—FIRST QUARTER.

1. 73,062 + 5,901 + 87 + 345 + 6,009 + 28,473.
2. Take 9,402 from 13,080.
3. 86,397 × 36.
4. 7 × 7; 8 × 9; 11 × 12.

SECOND QUARTER.

1. What is the difference between thirty-eight thousand and eighteen and forty thousand and seventeen?
2. 27,912 ÷ 4.
3. 56,087 × 529.
4. 38d.; 45d.; 69d.

THIRD QUARTER.

1. 94,765 × 8,040.
2. 48,369 ÷ 7.
3. A boy had 214 marbles. He lost 38 and gave 59 away. How many had he left?
4. 83d.; 119d.; 135d.

STANDARD III.—FIRST QUARTER.

1. Divide 79,424 by 17.
2. Find the product of seventy-nine thousand and eighty-six and five hundred and ninety.
3. How many times is four hundred and sixty-eight contained in three hundred and fifty-one thousand?
4. Seven boxes containing 600 oranges each are divided among 280 scholars. How many is that for each scholar?

SECOND QUARTER.

1. Find the amount of sixty-four pounds thirteen shillings and two pence three farthings, seventeen shillings and fourpence halfpenny, nine pence three-farthings, six pounds fifteen shillings and six pence, fourteen shillings and ten pence farthing, and eighteen pounds eighteen shillings and eight pence halfpenny.
2. Take eight pounds sixteen shillings and a halfpenny from four hundred and fifteen pounds eleven shillings and seven pence farthing.
3. (387,956 + 164,074) ÷ (705 − 638).
4. Thomas has £2 15s. 7d., and George has twice as much. How much have they together?

THIRD QUARTER.

1. Divide twenty-four thousand five hundred and ten nuts equally among twelve score and eighteen boys; how many will each boy receive?
2. £73 12s. 7¾d. + £6,030 7s. 9¼d. + £84 16s. 3½d. + £912 9s. 6d. + £6 14s. 11¼d. + £1,305 8s. 5¾d.
3. How much greater is seventy thousand three hundred and eighteen pounds eleven shillings and nine pence farthing than sixty-nine thousand seven hundred and five pounds sixteen shillings and ten pence three-farthings?
4. A boy has 9 half-crowns, and another boy has 15 sixpences, 13 threepences, and 87 pence. How much more has one than the other?

STANDARD IV.—FIRST QUARTER.

1. £847 15s. 10½d. × 69.
2. There are 5 chests of drawers; in each chest there are 8 drawers; in each drawer 6 divisions; and in each division there is placed 17s. 8¾d. How much money is deposited in the chests?
3. £9,346 12s. 4¾d. ÷ 11.
4. A person's salary is £256 15s. a year; how much is that weekly?

SECOND QUARTER.

1. Reduce £958 17s. 9d. to threepences.
2. How many miles in fourteen thousand and eighty steps, each step being 27 inches in length?
3. How often is 5 dwts. 23 grs. contained in 16 lbs. 1 oz. 1 dwt.?
4. A fruiterer bought 630 oranges for £2 13s. 6d. He sold them at 9 for a shilling. How much did he gain?

THIRD QUARTER.

1. How many tons, &c., are there in 17 bales of cotton, each of which weighs 290 pounds?
2. 28 men are sent to mow a field of 3a. 2r. 20p. 11 yds.; how many square yards should each man mow?
3. If I waste 5 minutes daily, what time would be wasted in the first three months of 1888?
4. A grocer mixes 12 lbs. of sugar at 3d. per lb. with 4 lbs. at 5d. per lb. What is the price of the mixture per lb.?

STANDARD V.—FIRST QUARTER.

1. Calculate (by practice) a person's income for 3 years at 8s. 4¾d. per day.
2. What is the cost of 19,017 articles at £29 16s. 11½d. each?
3. Find the difference in cost between 79 cwt. at 1½d. per lb. and 1,850 lbs. at £2 11s. 4d. per cwt.
4. What is the rent of a house for 7 months 2 weeks 3 days at 3½ guineas per month of 4 weeks?

SECOND QUARTER.

1. Make out this bill in proper form:—

17 gals. of ale at 2½d. per pint;
23 pints of porter at 2s. 4d. per gallon;
6½ dozen of claret at 1s. 9d. per bottle;
12 gals. of sherry at £33 1s. 6d. per hhd.

2. If 27 men can mow 21 acres in 3 days, how many men can mow 35 acres in the same time?
3. A person bought 7a. 3r. 9p. at £68 per acre, and 14a. 2r. 27p. at £60 per acre; the cost of the timber was 80 guineas in addition. Find the amount of the whole purchase.
4. I have to perform a journey of 326 miles in 24 hours. I travel 12 miles an hour for 5 hours; at what rate must I travel the remainder of the journey to get it completed in the required time?

THIRD QUARTER.

1. Add the least and the greatest of the following fractions:—$\frac{1}{2}$, $\frac{2}{3}$, $\frac{4}{7}$, and $\frac{5}{9}$.
2. A dealer bought 16 score eggs for £1 10s. If one score were broken, at what price per dozen should he sell the remainder to gain 7s. 6d.?

3. Reduce the fractions $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$, and $\frac{9}{10}$ to their least common denominator.

4. A man sold $\frac{1}{4}$ of his eggs, and then $\frac{2}{3}$ of the remainder; what fraction of the original number had he left?

STANDARD VI.—FIRST QUARTER.

1. Divide the sum of $\frac{7}{9}$ and $\frac{5}{6}$ by their difference.

2. Simplify $\frac{\frac{1}{2}+\frac{2}{3}-\frac{5}{6}}{\frac{7}{8}\times\frac{3}{10}\times2\frac{1}{2}}\times\frac{4}{5\frac{1}{3}}$.

3. Add together $\frac{1}{360}$ and $\frac{1}{225}$, and reduce the sum to a decimal.

4. Work the following to five decimal places:—
$3{\cdot}726 + {\cdot}05 + {\cdot}8917 - 2{\cdot}04068 \div {\cdot}094$.

SECOND QUARTER.

1. What decimal of £10 is ·0375 of a guinea?

2. If 13½ lbs. of tea cost £1 13s. 9d., what will 6 boxes, each containing 1¼ cwt., cost?

3. Bring $\frac{5\frac{1}{7}}{12}$ to a faction having 28 for its denominator.

4. What is the least sum of money that can be paid in sixpences, shillings, florins, half-crowns, crowns, half-sovereigns, or guineas?

THIRD QUARTER.

1. What is the amount of £750 for 219 days at 4⅖ per cent.?

2. How many times can $\dot{\cdot 5}$ be taken from $6{\cdot}\dot{6}$?

3. What sum will amount to £307 16s. in 4 years at 3½ per cent.?

4. A starts on a journey and goes 58 miles a day, and B starts 4 days afterwards and travels at 74 miles a day. In what time will B overtake A?

STANDARD VII.—FIRST QUARTER.

1. If 15 horses plough a field in 3½ days, working 8 hours per day, how long will it take 14 horses, working 10 hours per day?

2. If £450 gain £36 11s. 3d. in 2½ years, what is the rate per cent. per annum?

3. A wall a mile in length was to have been built by 46 men in 25 days, but at the end of 15 days only 920 yards were completed; how many more men were required to finish the work in the required time?

4. A person put £5,000 into a business. In the first year there was a gain of 4 per cent., in the second year a loss of 5 per cent., and in the third year a gain of 6 per cent.; what was the increase of the original capital at the end of the third year?

SECOND QUARTER.

1. The fields of a farm measure respectively 5a. 2r. 24p., 11a. 3r. 35p., 19a. 18p., 7a. 1r. 23p., and 13a. 3r.; what is their average size?

2. What is the discount on a bill for £490 7s., drawn April 1st at three months, and discounted April 22nd, at 4 per cent. per annum, allowing the three days of grace?

3. Seven men and five boys weighed altogether 127st. 8lbs. The average weight of the men was twice as much as that of the boys. What was the average weight of the boys?

4. Divide £76 10s. among three persons, so that for every £4 A has, B shall have £3, and C £2.

THIRD QUARTER.

1. The sum of £750 is put out at compound interest for 3 years at 8 per cent.; find the third year's interest.

2. One boy is 4½ ft. high, and another boy is 15 per cent. taller. How tall is the second boy?

3. A person transfers his 4½ per cent. stock at 112½ to another at 93¾; what rate of interest should the latter pay that his income may be unaltered?

4. In a certain town there were 5,800 electors; 2,764 voted for one candidate, and 2,601 for another. What per centage did not vote?

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	755.	1,341.	1,706.
2.	540.	146.	135.
3.	336.	73.	809.
4.	20; 21; 12.	36; 20; 66.	16; 45; 48.

STANDARD II.

	FIRST.	SECOND.
1.	113,877.	1,999.
2.	3,678.	6,978.
3.	3,110,292.	29,670,023.
4.	49; 72; 132.	3s. 2d.; 3s. 9d.; 5s. 9d.

THIRD.

1. 761,910,600.
2. 6,909 + 6.
3. 117 marbles.
4. 6s. 11d.; 9s. 11d.; 11s. 3d.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	4,672.	£92 0s. 5¾d.	95 nuts.
2.	46,660,740.	£406 15s. 6¾d.	£15,413 9s. 7½d.
3.	750 times.	8,239 + 17.	£612 14s. 10½d.
4.	15 oranges.	£8 6s. 9d.	4s. 6d.

STANDARD IV.—FIRST.

1. £58,497 15s. 4½d.
2. £212 15s.
3. £849 13s. 10¼d.
4. £4 18s. 9d.

SECOND.

1. 76,711 threepences.
2. 6 miles.
3. 648 times.
4. 16s. 6d.

THIRD.

1. 2 tons 4 cwt. 2 lbs.
2. 627 sq. yds.
3. 7 hrs. 35 min.
4. 3½d.

STANDARD V.—FIRST.

1. £459 13s. 5¼d.
2. £567,617 16s. 7½d.
3. £55 6s. — £42 7s. 11d. = £12 18s. 1d.
4. £27 19s. 1½d.

SECOND.

1. £1 8s. 4d. + 6s. $8\frac{1}{2}$d. + £6 16s. 6d. + £9 19s. 6d. = £18 11s. $0\frac{1}{2}$d.
2. 45 men.
3. £530 16s. 6d. + £880 2s. 6d. + £84 = £1,494 19s.
4. 14 miles an hour.

THIRD.

1. $1\frac{1}{6}$.
2. 1s. 6d.
3. $\frac{90}{120}$, $\frac{100}{120}$, $\frac{104}{120}$, $\frac{108}{120}$.
4. $\frac{1}{4}$.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	29.	·0039375.	£769 16s.
2.	$\frac{8}{21}$.	£105.	12 times.
3.	.007$\dot{2}$.	$\frac{12}{25}$.	£270.
4.	27·94702...	£10 10s.	$14\frac{1}{2}$ days.

STANDARD VII.

	FIRST.	SECOND.
1.	3 days.	11a. 2r. 12p.
2.	$3\frac{1}{4}$ per cent.	£3 17s. 10d.
3.	17 men.	6 st. 10 lbs.
4.	£236 8s.	A. £34, B. £25 10s., C. £17.

THIRD.

1. £94 15s. $8\frac{4}{25}$d.
2. 5 ft. $2\frac{1}{10}$ in.
3. $3\frac{3}{4}$ per cent.
4. $7\frac{1}{2}$ per cent.

Model Answers to Certificate Questions, Christmas, 1887.

Female Candidates.

FIRST YEAR.

Grammar and Composition.

(Three hours allowed for this Paper.)

N.B.—No candidate may omit the exercise in composition or in parsing, or attempt more than EIGHT questions in all.

COMPOSITION.

N.B.—This exercise must not extend beyond this page, but it may occupy all the blank space available.

Write a brief essay on *one* of the following subjects :—

(*a*) Hand work and head work in schools.
(*b*) Life on the sea.
(*c*) 'How small, of all that human hearts endure,
That part which laws or kings can cause or cure.'

(*a*) Hand Work and Head Work in Schools.

To many people the idea of education presents itself as nothing more than mental training and development. All thought of physical training is absent. But if the proper definition of education is the cultivation of the whole nature of man, the development as far as possible of all his faculties, then thought must be taken and means devised for training the hands as well as exercising the brain.

Let us consider first what provision is made in ordinary elementary schools for the two branches of education, mental cultivation and physical training. The art of reading, learning arithmetical tables and applying them to calculation, committing to memory spelling, and the facts of geography and history, exercising the reason and judgment about words and their use in sentences, are all parts of mental education, and they usually occupy by far the greater part of the time a child spends in school. Still we do provide some practice for the hands and exercise of the senses in connection with elementary instruction. The fingers have to learn to grasp the pencil and the pen, and to guide them carefully in writing and drawing. Even at an earlier stage the fingers of the infant scholar are employed in the various amusing but instructive exercises of the Kindergarten, in stick-laying, bead-threading, and mat-weaving. In girls' schools, needlework constitutes a continuation of this hand work, and, added to writing, occupies almost as much time as can fairly be allotted to this branch of education. The question is, however, well worthy of consideration, whether in boys' and girls' schools it may not be desirable to readjust the proportion of book learning and manual training, and to provide greater variety in the latter. The increased attention to drawing, particularly in boys' schools, is a distinct step in this direction, and the encouragement of practical cookery classes in connection with girls' schools is a laudable attempt to make education more varied and useful.

It has been suggested recently that manual training, especially in the use of common tools, should be introduced into elementary schools. Considerations of cost and convenience must have weight in deciding how to deal with this suggestion. If large numbers of children are to be trained in the use of tools, a great expense must be incurred for tools and the materials to practise upon; and rooms must be fitted up with all the needful appliances. This practical difficulty will almost alone suffice to confine to narrow limits the carrying out of the suggestion. In town districts, if not also in the country, the chief tools that could be brought into use in schools would be carpenters' tools: and the danger attending their use by untrained hands would suggest a limitation of such training to the older boys in the elementary schools. Perhaps indeed the best way to realise the idea of manual training would be to establish central schools or class-rooms where boys who had reached a certain reasonable standard of mental attainment might be encouraged to lengthen the period of their education by the opportunity of acquiring manual skill which would fit them for some useful employment as mechanics.

In order that such addition might be made to the ordinary course of elementary instruction without unduly prolonging the attendance at school, it would be necessary to curtail some of the other requirements; and perhaps the most rational way to do this would be to abandon the mechanical teaching of spelling in the lower classes, to give a greater amount of more intelligent practice of reading, and to relax the over-stringent demand for a rigid degree of accuracy which it is hardly reasonable to expect from young children.

There is one other thought which should not be lost sight of by those who regard our schools as terribly deficient in means of training the hands:—that during the much larger portion of waking time which children spend out of school, their natural imitative propensity leads them to practise handwork in various forms without its being made a lesson.

GRAMMAR.

2. Analyse *one* of the following passages :—

(*a*) As a bird *each* fond endearment *tries*
To tempt its new fledged offspring to the skies,
He tried each art, reproved each dull delay,
Allured to brighter worlds, and *led* the way.

(*b*) Though my harsh touch, *faltering* still
But mocked all time, and marred the dancer's skill,
Yet would the village praise my wondrous power,
And dance *forgetful* of the noontide hour.

(*c*) *While* around the *wave-subjected* soil
Impels the native to repeated toil,
Industrious habits in each bosom *reign*,
And industry begets a *love* of gain.

(*a*) 1. As a bird each fond endearment tries to tempt its new-fledged offspring to the skies.
Subordinate clause to 2, 3, 4, 5, adverbial of *manner*.
2. He tried each art.
Principal clause—
3. [he] reproved each dull delay.
Principal clause, contracted in subj., co-ordinate to 2, 3, 5.
4. [he] allured to brighter worlds.
Principal clause, contracted, co-ordinate to 2, 3, 5.
5. And [he] led the way.
Principal clause, contracted, co-ordinate to 2, 3, 4.

1.	As	connective.
	a bird	subject.
	tries	predicate
	each fond endearment	object with two attributives.
	to tempt its new-fledged offspring to the skies	extension of predicate, denoting *purpose*.

2. he	subject.
tried	predicate.
each art	object, with enlargement.
3. [he]	subject, understood.
reproved	predicate.
each dull delay,	object, enlarged.
4. [he]	subject, understood.
allured	predicate.
to brighter worlds,	extension of predicate, *place*.
and	connective.
5. [he]	subject, understood.
led	predicate.
the way	object.

(*b*) 1. (Though) my harsh touch, faltering still
But mocked all time.
Subordinate clause to 3, adverbial of concession.
2. (And) marred the dancer's skill.
Subordinate clause to 3, adverbial of concession.
3. (Yet) would the village praise my wondrous power,
Principal clause, co-ordinate with 4.
4. (And) dance forgetful of the noon-tide hour.
Principal clause, co-ordinate with 3.

1. Though	connective.
my harsh touch	subject enlarged.
faltering still	enlargement of subject, participial phrase.
but	extension of predicate, *degree*.
mocked	predicate.
all time	object, enlarged.
and	connective.
2. [my harsh touch]	subject, understood
marred	predicate.
the dancer's skill	object, enlarged by possessive case.
yet	connective.
3. the village	subject.
would praise	predicate.
my wondrous power	object, enlarged.
and	
4. [the village]	subject, understood.
[would] dance	predicate, contracted.
forgetful of the noontide hour	attribute to subject; or it may be regarded as extension of predicate denoting *manner*.

(*c*) 1. While around the wave-subjected soil
Impels the native to repeated toil.
Subordinate clause to 2, 3. Adverbial of *time*.
2. Industrious habits in each bosom reign.
Principal clause, co-ordinate to 3.
3. And industry begets a love of gain.
Principal clause, co-ordinate to 2.
While, connective, subordinative.

1. Around	extension of predicate, denoting *time*.
the wave-subjected soil	subject, enlarged.
impels	predicate.
the native	object.
to repeated toil	extension of predicate, *place*.
2. Industrious habits	subject, enlarged.
reign	predicate.
in each bosom	extension of predicate, *place*.
and	connective.
3. Industry	subject.
begets	predicate.
a love of gain	object, enlarged.

3. Parse *all* the words printed in italics in the foregoing extracts.

Each—adjective of number, distributive; attributive to 'endearment.'
tries—verb, reg. trans., indic. mood, pres. tense, 3rd pers., sing. numb., agreeing with subject 'bird.'
led—verb, irreg. trans., indic. mood, past tense, 3rd pers., sing. numb., agreeing with subject 'he' [parts, *lead*, *led*, *led*].
faltering—participle, present, active, attributive to 'touch.'
But—adverb of degree (= only), modifying 'mocked.'
yet—conjunction, adverbial, correlative to 'though.'
forgetful—adjective of quality, positive degree, describing 'village,' that is, the people of the village.
while—conjunction, adverbial, introducing subordinate clause denoting *time*.
wave-subjected—adjective, verbal compound, attributive to 'soil.'
reign—verb, reg. intrans., indic. mood, pres. tense, 3rd pers., plur. numb., agreeing with subject, 'habits.'
love—noun, abstract used as common, sing. numb., neut. gend., objective case, governed by 'begets.'

4. Show the exact meaning and force of the syllables distinguished by italics in the following words, and say from what language each is derived :—

Industri*ous*, forget*ful*, *sub*jected, depend*ence*, ostenta*tion*, artifici*al*, *trans*mit, free*dom*, lord*ling*, *for*lorn, *be*friend.

ous, derived from Latin *osus*, means full of, abounding in, pertaining to. The word 'industrious' applied to 'habits' means pertaining to industry.

ful, derived from Saxon *full*, means full of, apt to, or in the state of. The word 'forgetful' means apt to forget; as used in the above extract it means 'in the state of forgetting.'

sub, from Latin *sub*, means under; 'subjected' means thrown under the power of.

ence, from Latin *entia*, means state of; 'dependence' is the state or condition of depending on some one, or something.

tion, from Latin *tio*, means state of, or act of; 'ostentation' is the act or habit of doing anything for show, to attract attention.

al from Latin *alis*, means pertaining to, resulting from; 'artificial' means resulting from art or contrivance, as opposed to natural.

trans, Latin prefix, means over or across; 'transmit' means to send over.

dom, Saxon affix, means state of; 'freedom' is the condition of being free.

ling, Saxon affix, has diminutive force, and in the word 'lordling' the idea of contempt is expressed.

for, Saxon prefix with intensive force, something like the Latin prefix *per* in some words; 'forlorn' means quite lost, quite desolate.

be, Saxon prefix, forming transitive verb; 'befriend' means to act as a friend.

5. What incidental references are made in 'The Traveller,' and in 'The Deserted Village,' to the circumstances and experience of the poet's own life?

The whole plan of 'The Traveller' was doubtless suggested by Goldsmith's own wanderings in Holland, France, Germany, Switzerland, and Italy, and reflects his own impressions of what he saw during his travels in 1755 and 1756. In the passage—

> 'My heart untravelled fondly turns to thee;
> Still to my brother turns,'

Goldsmith refers to his brother, the Rev. Henry Goldsmith, who had the living of Lissoy, and who treated him very kindly. When he speaks of his 'prime of life in wandering spent and care,' he depicts the adventure and misfortune which clouded much of his life, through the lack of prudence which was very characteristic of the poet. His improvidence often left him without means of subsistence, and in his travels through France he often earned his meals and lodging by playing on the flute. This is referred to in the lines beginning—

> 'How often have I led thy sportive choir,
> With tuneless pipe beside the murmuring Loire?"

In 'The Deserted Village' it is supposed that Goldsmith has in his mind the village of Lissoy, where he spent his youth, and where his father and brother were clergymen. The touching lines—

> 'In all my wanderings round this world of care,
> In all my griefs—and God has given my share—
> I still had hopes, my latest hours to crown,
> Amidst these humble bowers to lay me down,'—

refer to the poet's wish to return to his old home and live in ease and quiet. The well-known portrait of the village preacher was probably drawn from his father, the Rev. Charles Goldsmith, though it has also been regarded as representing Oliver's brother Henry, who died two or three years before the poem was produced. His own experience possibly suggested the lines—

> 'The ruined spendthrift, now no longer proud,
> Claimed kindred there, and had his claims allowed.'

6. Reproduce in your own words, from 'The Traveller,' Goldsmith's description of Holland; *or*, from 'The Deserted Village,' the picture of the Village Schoolmaster.

(*a*) Holland is a country encroached on by the sea, where the people have to exert themselves in planning and constructing dikes or embankments to keep the water from inundating the land. Indeed, it almost seems to be a realm won from the ocean, and still in a measure supporting an amphibious race. Canals, valleys bright with flowers, banks crested with willows, smoothly sailing boats, busy markets, and well-cultured lands are all signs of conquests from the sea.

Still, the power of the ocean obliges the inhabitants to labour hard to protect their possessions, and their industry results in love of wealth, and those traits of character usually associated with the desire of gain.

(*b*) The village schoolmaster had a noisy home near the main road of the village. He was, however, stern in appearance and strict in discipline. Truants knew and feared him, and they could readily understand the signs of coming punishment when they saw his face. He was at times fond of joking, and his pupils were amused at his jests, or pretended to be so. His displeasure was speedily whispered about, and caused terror among the children. Still he was a kind man; and if he sometimes seemed austere it was through his love of learning. All the neighbours praised his knowledge, for amongst his accomplishments were writing, arithmetic, land-surveying, a knowledge of the tides, and even, it was said, ability to gauge. He was clever in argument also, as the parson readily admitted, for he could continue to discuss even when he was beaten; and his long and fine-sounding words moved the peasants to astonishment. The usual result was a general expression of wonder at his small head holding such a stock of knowledge.

7. Macaulay says of Goldsmith's two poems that the one is better in its plan, and the other in its execution. Explain and amplify this statement, and confirm it by detailed reference to illustrative passages.

Macaulay says 'The Traveller' is an exception to most of Goldsmith's works in this respect, that its execution, though deserving of much praise, is inferior to the design.

He considers that no philosophical poem has so noble and so simple a plan as that of the English wanderer sitting on an Alpine crag, surveying the boundless prospect before him, reviewing his long pilgrimage, recalling its scenes, its incidents, and the varying conditions of life, and working out the conclusion that our happiness is almost independent of forms of government—that it depends, in fact, almost entirely on our own character. It is difficult to instance passages illustrative of faults of execution in a poem which has been said to be 'without one bad line,' but probably Macaulay, whose criticism of Goldsmith seems rather severe, referred to the rather irregular and sometimes contradictory way in which the good and bad points of different countries are compared and balanced. As an example, it may be noticed how Britain's advantages are described, and then attributed to the presence of Freedom:

'Thine, Freedom, thine the blessings pictured here,'

and immediately afterwards this same Freedom is depicted as the source of various national woes:—

'That independence Britons prize too high
Keeps man from man, and breaks the social tie.'

With respect to 'The Deserted Village,' Macaulay's chief objection is not to the fallacious theory propounded about wealth and luxury, nor to the details of the poem, which are admitted to be almost unsurpassed in beauty. But there is a want of unity in the design. Its parts are incongruous. The village in its happy days is an English village; in its decay it is Irish. Macaulay says the poet could never have seen in his native country such a rural paradise as his 'Auburn,' and he could never have seen all the inhabitants of such a paradise in England turned out and forced to emigrate. The prosperous village he had probably seen in Kent, the ejectment in Munster. These criticisms may suffice to show that the plan of the poem is not homogeneous.

8. What appear to have been Goldsmith's views as to the influence of commerce and of wealth on human happiness? Have you observed any inconsistency in his utterances on this subject in different parts of the poems?

Goldsmith appears to have regarded commerce and wealth as antagonistic to general happiness, on the ground that the extension of commerce was apt to result in the amassing of wealth in the hands of the few. He feared that the increase of wealth would result in misery to the poor, and the depopulation of the country. No doubt there were and are cases in which the pleasure and luxury of a rich man are gained at the expense of toil and wretchedness among the poor. The accumulation of large estates in the hands of wealthy landowners has sometimes proved injurious to husbandry, and many would still look to small holdings and peasant proprietorship for a remedy for some social difficulties. Goldsmith's idea that commerce and wealth and luxury brought about the depopulation of a country, has, however, been disproved by the long continued prosperity and the increasing population of such countries as Belgium, England, and the United States. One leading statement in the poem is undoubtedly true:—

'Ill fares the land, to hastening ills a prey,
Where wealth accumulates and men decay.'

But the chief error of the poet seems to be in believing that the accumulation of wealth must cause the decay of men, that if the rich grow richer the poor must grow poorer, and the population become less. His reason for thinking so was possibly that he had observed the ruin of some prosperous district acquired by a pleasure loving rich man who threw his land out of cultivation for the sake of sport.

'Have we not
Seen opulence, her grandeur to maintain,
Lead stern depopulation in her train,
And over fields where scattered hamlets rose,
In barren solitary pomp repose?
Have we not seen at pleasure's lordly call,
The smiling long-frequented village fall?'

The most striking inconsistency perhaps is, that while widespread misery, and indeed all the evils of society seem to be attributed to the growth of commerce and the increase of wealth, as necessary consequences, the general conclusion is that 'bliss only centres in the mind.'

'In every government, though terrors reign,
Though tyrant kings, or tyrant laws restrain,
How small, of all that human hearts endure,
That part which laws or kings can cause or cure.'

9. Take the following grammatical terms: define them, and say in which of them the derivation of the word would be helpful in explaining its meaning and use in grammar, and whether in any case reference to the etymology would be useless or misleading to children:—Adjective, relative, verb, co-ordinate, syntax, pronoun, imperative, disjunctive.

Adjective is a word used with a noun to qualify it or limit its application. It is derived from Latin *ad*, to, and *jacio*, I throw or cast, *jactus*, thrown.

Relative is a kind of pronoun, which besides standing for a noun serves as a connective by referring to a noun or pronoun previously used in the sentence. It is derived from Lat. *re*, back, *fero*, I carry, *latus*, carried.

Verb is a word which *tells* something of the subject of a sentence. It is derived from Latin *verbum*, a word, and is so named as being the one indispensable word in every sentence.

Co-ordinate means of equal rank or importance grammatically. It is applied to the clauses of a sentence which are equally independent. It is derived from Latin *co* for *con*, with, together with, *ordo*, *ordinis*, rank, order.

Syntax is the set of rules for combining words into sentences. It is derived from Greek *συν*, together, *ταξις*, a placing. Thus it is etymologically an exact equivalent for the word 'composition.'

Pronoun is a word used instead of a noun. It is derived from Latin *pro*, for, instead of; *nomen*, a name.

Imperative is the manner of using the verb in order to command or entreat. It is derived from Latin *impero*, I command.

Disjunctive is a word used to describe such conjunctions as join words or sentences, but separate or disjoin their meaning, as the word *or*. It is derived from the Latin *dis*, apart, *jungo*, I join, *junctus*, joined.

With careful tracing of the application of the words the etymology might be made useful in explaining all these words; but those the derivation of which would be most certainly helpful are co-ordinate, syntax, pronoun, imperative, disjunctive. There would be some risk of children being misled by the etymology of verb and adjective; and in the case of the term relative very careful explanation is necessary.

10. Correct or justify the following expressions :— .

(*a*) A mutual silence took place for some time.
(*b*) That is the person whom I thought was in fault.
(*c*) I am sorry to differ with you.
(*d*) My lord's entertainments were both seldom and shabby.
(*e*) Bodily and intellectual labour are not to be paid at the same rate of wages.
(*f*) The Board has resolved to erect a school to accommodate a thousand children, three stories high.

(*a*) Substitute 'continued' for 'took place.'
(*b*) Substitute 'who,' for 'whom;' *or* 'to be' for 'was.'
(*c*) Substitute 'from' for 'with.'
(*d*) Change the adverb 'seldom' to the adjective 'infrequent;' *or*, say my lord's entertainments occurred but seldom, and were shabby.
(*e*) Insert 'for' after 'paid.' Labour is not paid ; it is paid for.
(*f*) 'Three stories high' should be placed immediately after 'school;' the phrase appears to describe 'children.'

Female Candidates.

SECOND YEAR.

Grammar and Composition.

(*Three hours allowed for this Paper.*)

No candidate must omit Question 1 or 2, or answer more than six other questions.

Composition.

N.B.—This exercise must not extend beyond this page, but it may occupy all the blank space available.

1. Write in plain language an essay on *one* of the following :—

(*a*) The Jubilee celebration.
(*b*) The character of Hamlet.
(*c*) The influence of example on conduct.
(*d*) 'Stone walls do not a prison make,
Nor iron bars a cage.'

(*c*) Among those who take an interest in the processes of education, no principle is more generally admitted than this, that example is more powerful than precept. It can scarcely be necessary to prove the fact that example does exercise a very potent force in moulding character and conduct. It is a matter of every day observation, and the principle stated above is simply the embodiment of general experience.

It may, however, be worth while to analyse the operation of this moral force. When a person follows an example which is generally regarded as good, we can understand that his conduct may be dictated by his faculty of reason, and his desire for approval. He observes that good actions in the example secure the approval of other people: he wishes to secure such approval for himself; he reasons that conduct approved in others will be approved in himself; and accordingly he endeavours to follow the example.

In the case of what is regarded as bad conduct, the force of example must work in a different way. It may be noticed that the exemplar derives some amount of pleasure from his bad conduct, that at any rate he does what he chooses; and, though his conduct meets with the reprobation of good men, some of his own kind may be found to encourage and even praise him. Then a younger person wishful to please himself, regardless of the question of moral right, is encouraged by the bad example. In reply to the remonstrances of his true friends, to the condemnation of the well-conducted, to the whispers of conscience, he pleads the example he follows : 'So-and-so does this, and why should not I.'

But probably the influence of example springs chiefly from that imitative faculty which comes into operation in the very earliest stages of conscious life, almost before reason can be said to dawn. Most persons have no doubt watched a child of very tender years attempting to do what he sees his parents and others do. He will pretend to brush his hair, to clean the furniture of a room, to read a newspaper long before he knows even his letters. This practice of mimicry continues and extends its range till it becomes a confirmed and almost unreasoning habit in regard to many things, and is only the subject of conscious reasoning in the most important matters of life.

From these considerations it will be readily acknowledged that since the influence of example is so great, it is of the highest importance in the education of every child that he should at the earliest stages of his life have good examples placed before him ; and that all who have any share in educating children should especially take care that their own conduct is as worthy of imitation as they can make it.

2. Paraphrase *one* of the following passages, and explain fully the connection in which it stands :—

(*a*) 'O what a noble mind is here o'erthrown !
The courtier's, soldier's, scholar's, eye, tongue, sword :
The expectancy and rose of the fair state,
The glass of fashion and the mould of form,
The observed of all observers ! quite, quite down !
And I, of ladies most deject and wretched,
That sucked the honey of his music vows,
Now see that noble and most sovereign reason
Like sweet bells jangled out of tune and harsh ;
That unmatched form and feature of blown youth,
Blasted with ecstasy : O, woe is me !
To have seen what I have seen ! see what I see !'

(*b*) 'The single and peculiar life is bound,
With all the strength and armour of the mind,
To keep itself from noyance, but much more
That spirit upon whose weal depend and rest
The lives of many. The cease of majesty
Dies not alone ; but like a gulf doth draw
What's near it with it ; it is a massy wheel
Fixed on the summit of the highest mount,
To whose huge spokes ten thousand lesser things
Are mortised and adjoined ; which, when it falls,
Each small annexment, petty consequence,
Attends the boisterous ruin. Never alone
Did the king sigh, but with a general groan.'

(*a*) In the first scene of the third act of Hamlet, it is arranged by the King and Polonius that, with a view to discovering the cause of his strange conduct, they shall watch the Prince when he meets Ophelia. After pronouncing the remarkable soliloquy on death and suicide, Hamlet observes Ophelia, and enters into conversation with her and utters many cynical remarks, somewhat unconnected, and strangely rude and uncourteous. Concluding with the command, 'To a nunnery, go,' he leaves Ophelia, and she soliloquises 'O, what a noble mind is here o'erthrown !' &c.

Paraphrase.—Behold the ruin of a lofty intellect ! The keen perception of the scholar, the polished speech of the courtier, the brave spirit of the knight, the hope and flower of the nation he adorned, the mirror in which fashion found its image, the model of manly beauty, the centre to which all eyes were turned—and lo, he is brought down utterly ! And I whose ears drank in the sweet music of his tender avowals, am now become the most depressed and miserable of ladies, seeing such noble and powerful faculties thrown into discord and confusion like the jangling of bells not tuned to each other, such matchless symmetry and personal beauty of the perfect flower of manhood blighted with madness ! O bitter grief is mine to see this woeful wreck of such a noble ideal.

(*b*) When the King has become convinced of the danger to himself of Hamlet's probable suspicion or knowledge of the guilt by which he gained the crown, he contrives a plan of getting rid of the danger by sending Hamlet to England in charge of Rosencrantz and Guildenstern. When he broaches the matter to them, each of them with rather courtier-like speeches expresses his readiness to carry out the King's design. The speech of Rosencrantz is the one beginning 'The single and peculiar life,' &c.

Paraphrase.—It is the duty of every private person to use all possible care and forethought to defend his life from injury. But it is especially the duty of the man in whose welfare is bound up the safety of the nation. When a monarch dies, his death is not all that happens ; like a whirlpool it draws to ruin whatever comes within its range. Such an event is like some massive wheel, placed on a lofty mountain, and having connected with its mighty spokes multitudes of smaller parts. When this wheel falls from its position every little rod or band or wheel which has the least connection with it shares in the general destruction. So the grief of the King involves the suffering of his people.

3. Say in what sense Shakespeare used the following words, and give the derivation in each case :—

Censure, clepe, cerements, unanealed, lazar-like, gyves, fantasy, conceit, unction, occulted.

censure,—opinion, not necessarily unfavourable, from Latin *censeo*, I think or judge.

clepe,—call, from Anglo-Saxon *cleopian*, to call. Milton uses the participle *yclept*.

cerements,—grave clothes, from Latin *cera*, wax. It was an old English custom to use a waxed cloth for a shroud.

unanealed,—not having received the sacrament of extreme unction. The word 'unaneled' is from an old English word *anele*, to anoint with oil.

lazar-like,—like a leper. *Lazar* is derived from *Lazarus*, the leper in the parable of Dives and Lazarus.

gyves,—fetters, from Welsh *gefyn*, fetters; the expression 'stockings downgyved to his ancle' means with his stockings hanging about his ancles like fetters.

fantasy,—imagination, from Greek *φαντασια*, the power of making anything appear, from *φαινω*, I appear. Fancy is a corrupted form of the same word, but is now used in a rather different sense.

conceit,—imagination, from Latin *con*, together, *capio*, I take. *concipio*, I take together, through French *concevoir*, to conceive, to frame in the mind. The word conceit is also used by Shakespeare for fanciful turn of speech or play upon words.

unction,—an ointment, from Latin *ungo*, I anoint, *unctio*, the act of anointing. The word is commonly used as an abstract noun, for the act of anointing.

occulted,—concealed, secret, from Latin *occulto*, I conceal, from *ob*, *oc*, and root of *celo*, I hide, connected with Greek *καλυπτω*, I hide.

4. Analyse the passage—

'What would he do
Had he the motive and the cue for passion
That I have?'

(*a*) What would he do. Principal clause.
(*b*) Had he the motive and the cue for passion
Subordinate clause to (*a*), adverbial of condition.
(*c*) That I have.
Subordinate clause to (*b*), attributive to 'motive' and 'cue.'

(*a*)	He	Subject.
	would do	Predicate.
	what	Object.
(*b*)	[if] he	Subject.
	had	Predicate.
	the motive and cue for passion.	Object.
(*c*)	I	Subject.
	have	Predicate.
	that	Object.

5. Comment on the grammar of the following passages, and parse the words printed in italics :—

(*a*) *Pray* you, no more.
(*b*) Tell me *he* that knows.
(*c*) *Shall* we to the court?
(*d*) Rich gifts *wax poor*.
(*e*) Try what repentance *can*.

(*a*) This is an example of a form of ellipsis common in Shakespeare: It stands for 'I pray you, say no more.'

Pray. Verb, reg. trans., indic. md., pres. tense, 1st pers., sing. numb., agreeing with subject *I* understood. The verb 'pray' is often used intransitively (parts, *pray, prayed, prayed*).

(*b*) This is equivalent to 'let him that knows tell me.' It is a rather uncommon form of the imperative of the 3rd person.

he. Pronoun, personal, 3rd pers., sing. numb., masc. gend., nominative case, used as subject to 'tell,' and antecedent to 'that.'

(*c*) This is a common form of ellipsis, 'go' being understood.

shall. Verb, irreg. intrans., indic. md., pres. tense, 1st pers., plur. numb., agreeing with subject 'we.' Shall is an auxiliary of the future tense, but considered by itself it is present.

(*d*) 'Wax' is an incomplete verb like 'become,' 'poor' forms its completion.

wax. Verb, reg. intrans., indic. md., pres. tense, 3rd pers., plur. numb., agreeing with subject 'gifts,' (parts *wax, waxed, waxed*).

poor. Adjective of quality, positive degree, attributive to 'gifts' understood, or predicative of 'gifts' the subject.

(*e*) This is an instance of the old use of 'can' as a principal verb, with the meaning 'is able to do.' The more modern usage would add 'do,' an infinitive.

can. Verb, irreg. trans., indic. md., pres. tense, 3rd pers., sing. numb., agreeing with subject 'repentance,' governing objective case included in 'what' (parts, *can, could*).

6. Take one of these characters—

Polonius, Laertes, Osric,

and say what part he plays in the drama, illustrating your answer by quotations.

Polonius is the Lord Chamberlain at the Court of Claudius, King of Denmark. We may understand that he held the same office under the previous king, Hamlet. He is the father of Ophelia and Laertes. At his first appearance in the play he tells the king that he has rather unwillingly assented to his son's return to France. His advice to Laertes, on parting with him, beginning thus:—

'And these few precepts in thy memory
See thou character. Give thy thoughts no tongue,
Nor any unproportion'd thought his act:
Be thou familiar, but by no means vulgar,'

and ending:

'This above all—to thine own self be true;
And it must follow as the night the day
Thou canst not then be false to any man,'

contains many excellent and oft-quoted maxims; but it may be noticed that their wisdom is mainly of the worldly sort.

So, in the conversation with his daughter, immediately afterwards, he cautions her in a not over-delicate way, rather as a man of the world than a tender-hearted father. His low opinion of human nature appears all through this interview, as in the remark:—

'Affection? pooh! you speak like a green girl,
Unsifted in such perilous circumstance,'

and respecting Hamlet he says:—

'Believe so much in him, that he is young;
And with a larger tether may he walk,
Than may be given you: in few, Ophelia,
Do not believe his vows.'

In the second Act his character is further shown in his despatch of Reynaldo as a spy on his son's doings in Paris. His suspicious suggestions and his underhand modes of arriving at the truth are marks of the worldly wisdom on which he prides himself.

'Your bait of falsehood takes this carp of truth:
And thus do we of wisdom and of reach,
With windlasses, and with assays of bias,
By indirections find directions out.'

Then Polonius, hearing from Ophelia of the apparent madness of Hamlet, jumps at once to the conclusion that he is mad for love of Ophelia, and that the sad circumstance is due to that love being rejected. He regrets that he had not judged him more favourably.

'It seems as proper to our age
To cast beyond ourselves in our opinions,
As it is common for the younger sort
To lack discretion.'

Very soon Polonius makes known to the king that he has found 'the very cause of Hamlet's lunacy.' In several speeches to the king and queen he exhibits his pedantry, his self-conceit, and unfolds his scheme for spying out the truth.

'I'll loose my daughter to him:
Be you and I behind an arras then:
Mark the encounter: if he love her not,
And be not from his reason fallen thereon,
Let me be no assistant for a state,
But keep a farm and carters.'

In the interview which follows between Polonius and Hamlet, the latter, in his assumed madness, plays upon the old courtier's weaknesses; and Polonius is struck by the strangeness, and yet the aptness of Hamlet's remarks. Polonius introduces the players to Hamlet, and is present at the play which is acted before the court. After this he plans to listen to what Hamlet says in a conversation with the Queen, and while hiding behind the arras is stabbed and killed by Hamlet, who 'took him for his better,' that is, for the king.

Laertes, son of Polonius, is, at the opening of the play, about to return to France, whence he has come to Denmark to be present at the coronation of Claudius. Before leaving he gives his sister Ophelia some brotherly advice concerning 'Hamlet, and the trifling of his favour.'

> 'On his choice depends
> The safety and the health of the whole state,
> And therefore must his choice be circumscribed
> Unto the voice and yielding of that body
> Whereof he is the head.'
> 'Virtue itself scapes not calumnious strokes.'
> 'Be wary then, lest safety lies in fear.'

Then the young courtier takes leave of his father, and we know no more of him till Polonius sends Reynaldo to watch him in Paris.

Next we find him, after the death of Polonius, coming armed to the king's palace at the head of a band of Danes to demand his father. The king quickly determines to turn Laertes' thirst for revenge to his own account. In the midst of the interview Ophelia enters, and her melancholy madness, the result of her father's violent death, further incenses her brother, and he exclaims—

> 'Hadst thou thy wits, and didst persuade revenge,
> It could not move me thus.'

In a later scene the king unfolds to Laertes a plan for revenging himself on Hamlet by treachery and foul play in a fencing match. The worst feature of Laertes' character appears in his readiness to resort to dishonourable means to accomplish his revenge. He says he has an unction he bought from a mountebank, and adds—

> 'I'll touch my point
> With this contagion; that, if I gall him slightly,
> It may be death.'

His grief for his sister seems very genuine, though marked by the extravagance which commonly accompanies a rash and impulsive nature.

> 'Lay her i' the earth;
> And from her fair and unpolluted flesh
> May violets spring! I tell thee, churlish priest,
> A ministering angel shall my sister be,
> When thou liest howling.'

Laertes and Hamlet meet in the grave of Ophelia and struggle madly, and their next encounter is in the fencing match at court. In the course of this Laertes wounds Hamlet with the poisoned point, an exchange of weapons is effected, and Hamlet wounds Laertes mortally. Laertes tells Hamlet of his danger, and exclaims 'the king's to blame!' and his last words are

> 'Exchange forgiveness with me, noble Hamlet;
> Mine and my father's death come not upon thee,
> Nor thine on me!'

Osric, a courtier, is one of the minor characters in the play. He appears only in the last scene, when he is the bearer to Hamlet of the king's proposal that the prince shall meet Laertes in a fencing-bout. He has but little to say: but what he says and the way he says it, shows him to be a type of the foppish courtiers who considered gentility to consist in affectation of language, and the observance of an elaborate code of etiquette. Hamlet mimics him, and speaks of him as a 'water-fly.' In the fencing-match he takes the interest of a connoisseur, interpolating remarks on the progress of the sport, as 'a hit, a palpable hit.' After the tragic close of this incident, he announces the approach of Fortinbras.

> 'Young Fortinbras, with conquest come from Poland,
> To the ambassadors of England
> Gives this warlike volley.'

7. Describe Addison's visit to the country church with Sir Roger, and say how far the narrative illustrates (*a*) the manners of the time; (*b*) Addison's humour; and (*c*) the chief characteristics of his style.

The essay in which Addison describes Sunday at Sir Roger de Coverley's has for its motto a line from Pythagoras, which means 'Pay reverence first, as is ordained by law, to the immortal gods.' Addison first expresses the liking he has for the country way of spending Sunday. He regards it as a means of preventing a degeneration into barbarism. The people put on their best faces, with their cleanliest habits, join in friendly converse on their way to church, and meet for a gossip in the church-yard, and then join in acts of adoration, and listen to good advice.

He observes that Sir Roger has beautified the inside of the church with texts, and otherwise adorned it. He has provided each of the parishioners with a hassock and a Prayer Book, and he has had them instructed in psalm-singing with good effect. Sir Roger, being landlord to the whole congregation, keeps them in order, and will not let them fall asleep. If he happens to do so himself, on awaking, he stands up, looks about him, and takes care to awake anybody who may be nodding. He is very hearty in the responses, though he is sometimes out of time with the rest. Occasionally, while the rest are kneeling, he stands up to count the congregation, or see if any of his tenants are missing. His guest heard him once call out in the midst of the service to tell one John Matthews, who happened to be restless, not to disturb the congregation. When the service is over, the tenants stand on each side of the aisle, bowing while the knight passes down between the double row of them, and stops to ask one and another how such and such a member of the family is who happens not to be at church. This is understood as a quiet rebuke for the absentee.

On catechising days he sometimes rewards a child with a Bible for answering well, and will even send a flitch of bacon to his mother. He has increased the clerk's salary by five pounds, and has promised that the post when vacant shall be given to the most deserving young man in the village.

Addison further notices the good feeling which exists between the knight and the chaplain, and contrasts it with the very different state of things in the next village, where, much to the detriment of the cause of religion and virtue, a kind of war perpetually prevails between the squire and the parson. Finally, he remarks that such feuds do much harm to ordinary people, because they are apt to think the most important doctrines cannot be of much consequence when rich people disregard and disbelieve them.

(*a*) In this descriptive essay we may notice that in Addison's time people in country places were thoroughly dependent on the squire, but there was a great deal of kindly, homely feeling displayed in the relationship. The practice of meeting for a gossip in the churchyard before service, and lingering there afterwards, was very common, and is not yet obsolete in some villages. The country clergy of the early part of the eighteenth century were in many cases uncultured men, and this accounts for the remarks on the parson of the neighbouring village. The reference to tithe-stealers suggests that in those days tithes were paid in kind, direct to the clergy.

(*b*) Addison's humour was of the light, sparkling kind, very harmless, and very pleasing. It is illustrated in the picture of the knight allowing no one to sleep at church except himself, in his standing up to count the congregation, in his lengthening out the verses of the Psalms, in his calling out to John Matthews to keep quiet, and in the description of the gathering in the churchyard.

(*c*) This essay is an excellent example of the smooth natural ease which characterises Addison's style. It shows well how he could observe the precept—'Be thou familiar but by no means vulgar.' And with all the ease and lightness of the composition, the words are used with the utmost care and accuracy. There is no straining after effect by excessive antithesis, or by the artificial balancing of sonorous words, and the result is a simple yet elegant, sober and playful style which cannot fail to charm.

8. What inference may be drawn from the play of Hamlet respecting the state of the drama and theatrical representation in Shakespeare's time?

From a careful study of the references to actors and the drama which are contained in Acts II. and III. of Hamlet, we may gather that the stage was under a very thorough control by the Government. It appears, too, that personal abuse was sometimes introduced, and that action had been taken to stop it. Two companies were licensed—those of the Globe and Fortune Theatres. These were forced to travel, either on account of some Government 'inhibition,' or more probably through the 'innovation' of a license being granted to children of the Queen's Revels and of the Chapels Royal to perform at the regular theatres, and the popularity of the child-actors throwing the adult players out of employment.

We may also notice that female parts were played by boys; that chopines or shoes with thick soles were used to raise the height of children playing some parts; that in the theatres the cheapest places were not in high galleries, but in the lowest part of the theatre—'to split the ears of the groundlings;' that a habit of ranting was prevalent with some players; that some actors, particularly the clowns, were in the habit of saying 'more than was set down for them;' that dumb show was sometimes adopted to foreshadow the plot or argument of a play.

As Hamlet was allowed to interpolate a passage, we can understand that the plays of Elizabeth's time were subject to alterations from time to time, as we know Shakespeare's own productions were, particularly this play of Hamlet.

9. Explain why it is that so high a rank is usually assigned to Hamlet as a work of dramatic art. What are the special literary gifts and powers which are exhibited in this play, and what other dramas of Shakespeare's are usually classed with Hamlet as belonging to the same period?

There is probably no work of Shakespeare's which deserves to take a higher place than the tragedy of Hamlet. This is not so much due to any superiority of its literary style over that of the other plays, as to the depth and variety of the problems of life with which it deals; to the marvellous insight into the working of the human mind; to the remarkable combination and dovetailing of so many incidents into a connected whole, with a sudden, striking, and yet almost inevitable *denouement*. Hamlet, indeed, is not merely a tragedy and a history, but an unrivalled practical study in mental and moral philosophy. Among the features which help to distinguish the play are the supernatural appearance of the elder Hamlet, the assumed madness of the prince, the real madness of Ophelia, the wonderful play scene, the plot to get rid of Hamlet and its defeat, the scene with the gravediggers, and the final catastrophe. It is marked also by great variety and distinctness in the characters—the introspective, meditative, irresolute Hamlet; the pedantic, conceited, worldly-minded old courtier, Polonius; the impulsive, shallow, well-meaning young man of the world, Laertes; the steady, faithful friend, Horatio; the gentle, loving Ophelia; the ambitious, intelligent, but unscrupulous King; the pleasure-loving, weak-willed Queen; the pliant courtiers Rosencrantz and Guildenstern; the popinjay Osric; the well-disciplined soldiers Marcellus and Bernardo; and the natural, rude-witted gravediggers. Hamlet overshadows all in interest and in importance, but all are true, real, life-like characters, and each one has a distinct place and share in the development of the action of the play.

The special gifts and powers necessary to the production of such a work as Hamlet are, first, that far-reaching, imaginative faculty which has gained for Shakespeare the name 'myriad-minded,' and which enabled him to project himself into the minds of his characters, so as to fully understand their feelings under the circumstances in which he placed them; next, constructive skill in arranging and developing a plot; third, a sense of proportion to keep the various parts and details in proper relation and due subordination to each other; besides these, a wide and exact knowledge of words, and a complete command over the vocabulary, so as to suit the expression to the matter to be expressed; and, lastly, a perfect acquaintance with the technical business of the stage.

The other plays which Shakespeare is believed to have produced during the same period as Hamlet, are Julius Cæsar, Macbeth, King Lear, Coriolanus, Anthony and Cleopatra, Measure for Measure, Troilus and Cressida, Timon of Athens. These were produced between 1600 and 1609, that is in the third of the four periods into which Shakespeare's activity as a playwright has been divided.

10. Quote from this play any passages which you consider specially memorable on account of either (*a*) the beauty of the expression; or (*b*) the worth of the truth expressed.

(*a*) *Marcellus'* speech,

'Some say that ever 'gainst that season comes
Wherein our Saviour's birth is celebrated,
The bird of dawning singeth all night long:
And then, they say, no spirit dare stir abroad,
The nights are wholesome, then no planets strike,
No fairy takes nor witch hath power to charm,
So hallowed and so gracious is the time.'

Bernardo:

'But, look, the morn, in russet mantle clad,
Walks o'er the dew of yon high eastward hill.'

Hamlet:

'Seems, madam! nay, it is; I know not "seems"
down to—
These but the trappings and suits of woe.'

Horatio:

'What if it tempt you toward the flood, my lord,
to—
And hears it roar beneath.'

Hamlet:

'To be or not to be . .
Be all my sins remembered.'

Ophelia:

'O what a noble mind is here o'erthrown!
to—
To have seen what I have seen, see what I see.'

The Queen:

'There is a willow grows aslant a brook,
to—
To muddy death.'

(*b*) *Polonius*:

'And these few precepts in thy memory
to—
Thou canst not then be false to any man.'

Hamlet:

'But to my mind, though I am native here,
to—
To his own scandal.'

Hamlet:

'Nay, do not think I flatter;
to—
As I do thee.'

And:

'How all occasions do inform against me
to—
When honour's at the stake.'

(*To be continued.*)

Jeanne d'Arc, by Lamartine.

TRANSLATED BY A. M. BOWER,

Late Master in University College School, London.

JEANNE D'ARC.	JOAN OF ARC.
I.	
L'amour de la patrie	The love of the fatherland
est aux peuples	is to nations
ce que l'amour de la vie	what the love of life
est aux hommes isolés,	is to individuals (lit. *isolated men*),
car la patrie est la vie des nations.	for the fatherland is the life of nations.
Aussi cet amour de la patrie	That-is-why (= *therefore*) this love of the fatherland
a-t-il enfanté,	has brought forth,
dans tous les temps	in all ages
et dans tous les pays,	and in every country,
des miracles d'inspiration,	miracles of inspiration,
de dévouement et d'héroïsme.	devotion and heroism.
Comment en serait-il autrement?	How could it be otherwise?
Les actes sont proportionnés	Actions are in-proportion
à la force du mobile	to the motive power
qui les produit.	which produces them.
La passion du citoyen	The passionate-love of the citizen
pour sa patrie se compose	for his native-land is-made up
de toutes les passions	of all his passions
personnelles ou désintéressées	personal or disinterested
dont Dieu a pétri le cœur humain:	wherewith God has filled (lit. *kneeded*) the human heart:
amour de soi-même,	self-love (= *love of life*)

et défense du droit sacré	and the defence of that sacred right
que tout homme	which every man
venant en ce monde	coming into this world
a d'occuper sa place	possesses of occupying his place
au soleil sur la terre ;	in the sun on this earth (*i.e.*, of living here below) ;
amour de la famille,	the love of family,
qui n'est que la patrie	which is only one's native land
rétrécie et serrée	concentrated and pressed
autour du cœur de ses fils ;	around the heart of its sons ;
amour du père, de la mère,	the love of father, mother,
des aïeux, de tous ceux	ancestors, of all those
de qui on a reçu le sang,	from whom we have received life,
la tendresse, la langue, les soins,	tenderness, language, loving-cares,
l'héritage matériel ou immatériel,	an inheritance material or immaterial,
en venant occuper la place	on coming to take the place
qu'ils nous ont préparée	which they have prepared for us
autour d'eux ou après eux	with them or after them
sous le toit ou	under the roof or
dans le champ paternel ;	among the ancestral fields ;
amour de la femme,	the love of woman,
que notre bras doit protéger	whom our arm is-bound to protect
dans sa faiblesse ;	in her weakness ;
amour des enfants,	the love of children,
en qui nous revivons	in whom we live again
par la perpétuité du sang	by the perpetuation of our blood
et à qui nous devons laisser,	and to whom it is our duty to leave,
même au prix de notre vie,	even at the cost of our life,
le sol, le nom, la sûreté, l'indépendance,	the soil, the name, the safety, the independence,
l'honneur national,	the national honour,
qui font la dignité de notre race ;	which constitute the dignity of our race ;
amour de la propriété,	the love of property (ownership),
instinct conservateur de l'espèce,	the preserving instinct of mankind,
qui incorpore à chaque homme	which embodies in every man
un morceau de cette terre	a part of that earth
dont il est formé ;	out of which he is made ;
amour du ciel, de l'air, de la mer,	the love of the sky, air, sea,
des montagnes, des horizons,	of mountains, horizons,
des climats, âpres ou doux,	climates, severe or mild,
mais dans lesquels nous sommes nés	but under which we have been born
et qui sont devenus,	and which have become,
par l'habitude,	through habit (*custom*),
des parties de nous-mêmes,	portions of ourselves,
des besoins délicieux de notre âme,	delightful exigencies of our souls,
de nos yeux, de nos sens ;	of our eyes, and of our senses ;
amour des mœurs, des langues,	the love of those customs, languages,
des lois, des gouvernements,	laws, and governments,
qui nous ont, pour ainsi dire, emmaillottés	which have, so to speak, swathed (swaddled) us,
dès le berceau,	from the very cradle,
que nous pouvons	which we have-the-power
vouloir modifier librement	to - insist - upon modifying freely
par notre propre lumière	in - accordance - with our knowledge (*light*)
et par notre volonté nationale,	and the will of the nation,
mais dont nous ne devons pas	but of which we ought not
permettre qu'on nous exproprie	to permit anyone to dispossess us
par la violence de l'épée étrangère,	by the violence of an alien sword,
car la civilisation même,	for civilisation itself,
imposée par la force,	(when) imposed by force,
est une servitude,	is a slavery,
et la première condition	and the first (essential) condition
pour qu'un progrès social soit accepté	in order that social progress may be accepted
par un peuple, c'est	by a nation, is
que ce peuple soit libre de le refuser.	that this nation should be at liberty to refuse it.
En récapitulant par la pensée	By recapitulating in thought
toutes ces passions instinctives	all these instinctive passions
dont se compose pour nous	out of which (there) arises in us
l'amour de la patrie,	the love of the fatherland,
et en y ajoutant encore	and by adding thereto that other
une passion naturelle à l'homme,	passion natural to man,
la passion de sa propre mémoire,	the fondness for his own fame,
du souvenir de ses contemporains	for the memory of his contemporaries
et de ses descendants,	and of his descendents,
de la gloire de la postérité	of the glory of posterity
qui inspire et qui récompense	which inspires and rewards
dans le lointain les grands sacrifices,	in the distant future those great sacrifices,
les dévouements jusqu'à la mort	devotion even to death
à son pays, on comprend que,	to one's country, we understand that,
de toutes les nobles passions humaines,	of all noble human passions,
celle-là est la plus puissante	that one is the most powerful
parce qu'elle les contient toutes à la fois,	because it embraces them all in one,
et que, s'il y a dans l'histoire	and because, if there are in history
des efforts surnaturels	superhuman exertions
à attendre de l'humanité,	to be expected from humanity,
il faut les attendre du patriotisme.	it is from patriotism (alone) that we must expect them.

II.

Toutes les fois qu'un pareil sentiment	Whenever such a feeling
monte jusqu'à l'enthousiasme dans un pays,	rises to enthusiasm in a country,
les femmes l'éprouvent au même degré,	the women feel it to the same degree,
et même à un degré supérieur aux hommes.	and even to a greater degree than the men.
La patrie ne leur appartient pas	The fatherland belongs not
plus qu'à nous ;	more to them than to us ;
mais comme elles sont,	but since they are,
par leur nature,	by nature,
plus impressionnables,	more impressionable,
plus sensibles et plus aimantes,	more sensitive and more loving,
elles s'incorporent plus personnellement,	they become personally more identified,
par tous leurs sens	in all their feelings
et pas tout leur cœur,	and in all their love,
à ce qui les entoure.	with their surroundings.
Cette chère et délicieuse image	This beloved and delightful image
de la patrie se compose, pour elles,	of the fatherland is made up, with them,

de leurs mères, de leurs sœurs,	of their mothers, sisters,
de leurs frères, de leurs époux,	brothers, husbands,
de leurs enfants, de leurs foyers,	of their children, their homes,
de leurs tombeaux, de leurs temples,	their graves, their temples,
de leurs dieux,	their gods,
et elles s'y attachent	and they cling to them
comme les choses faibles aux choses fortes,	as weak things to strong
avec d'autant plus d'enlacements	with all the more tenacity
et de frénésie que,	and passionate attachment that,
quand ces appuis s'écroulent,	when these supports fall away,
elles périssent avec eux.	they perish with them.

III.

Et puis (nos pères le savaient)	And then (our fathers knew it)
la femme, inférieure par ses sens,	woman, (though) physically inferior,
est supérieure par son âme.	is superior in soul.
Les Gaulois lui attribuaient	The Gauls attributed to her
un sens de plus, le sens divin.	an additional sense, the sense divine.
Ils avaient raison.	They were right.
La nature leur a donné	Nature has given them
deux sens douloureux, mais célestes,	two torturing but heavenly senses,
qui les distinguent	which distinguish them
et qui les élèvent souvent	and which often raise them
au-dessus de la condition humaine :	above the ordinary state of man :
la pitié et l'enthousiasme.	pity and enthusiasm.
Par la pitié elles se dévouent,	Through pity they show their devotion,
par l'enthousiasme elles s'exaltent.	through enthusiasm their spiritual exaltation.
Exaltation et dévouement,	Enthusiasm and self-devotion,
n'est-ce pas là tout l'héroïsme?	do not these constitute heroism ?
Elles ont plus de cœur et	They have more heart and
plus d'imagination que l'homme :	more imagination than man:
c'est dans l'imagination	it is in the imagination
qu'est l'enthousiasme,	that enthusiasm exists,
c'est dans le cœur	it is in the heart
qu'est le dévouement.	that devotion resides.
Les femmes sont donc	Women are therefore
plus naturellement héroïques que les héros.	by nature more heroic than heroes.
Et quand cet héroïsme doit aller	And when this heroism
jusqu'au merveilleux,	rises to the marvellous,
c'est d'une femme	it is from woman
qu'il faut attendre le miracle.	that we must expect miracles.
Les hommes s'arrêteraient à la vertu.	Man would stop at virtue.

IV.

Toutes les nations ont	All nations have
dans leurs annales	in their history
quelques-uns de ces miracles de patriotisme	some of these miracles of patriotism
dont une femme est l'instrument	of which a woman is the instrument
dans les mains de Dieu.	in the hands of God.
Quand tout est désespéré	When everything is despaired of
dans une cause nationale,	in a national cause,
il ne faut pas désespérer encore,	still we must not despair,
s'il reste un foyer de résistance	if there remain a centre of resistance
dans un cœur de femme,	in a woman's heart,
qu'elle s'appelle Judith,	whether she is called Judith,
Clélie, Jeanne d'Arc,	Clelia, Joan of Arc,
la Cava en Espagne,	la Cava in Spain,
Vittoria Colonna en Italie,	Vittoria Colonna in Italy,
Charlotte Corday de nos jours.	or Charlotte Corday in our days.
A Dieu ne plaise	God forbid
que je compare celles que je cite !	that I should compare those whom I have mentioned !
Judith et Charlotte Corday se dévouèrent,	Judith and Charlotte Corday devoted themselves,
mais elles se dévouèrent jusqu'au crime.	but they devoted themselves to a crime.
Leur inspiration fut héroïque,	Their inspiration was heroic,
mais leur héroïsme se trompa d'arme :	but their heroism mistook its weapon :
il prit le poignard du meurtrier,	it grasped the dagger of the assassin,
au lieu de saisir le glaive du héros.	instead of seizing the hero's sword.
Leur dévouement fut célèbre,	Their devotion was celebrated,
mais il fut flétri, et c'est juste.	but it was branded, and that is just.
Jeanne d'Arc ne s'arma que	Joan of Arc only armed herself
de l'épée de son pays :	with the sword of her country ;
aussi fut-elle pour son temps,	therefore she was for her time,
non pas seulement l'inspirée du patriotisme,	not only a woman inspired by patriotism,
mais l'inspirée de Dieu.	but inspired by God.

V.

Ces inspirations,	These inspirations,
dont les crédulités populaires	out of which popular credulity
font des merveilles,	makes miracles,
sont-elles des miracles surnaturels en effet,	are they in reality supernatural miracles,
des évocations matériellement divines,	emanations materially divine,
appelant par leurs noms	calling out by their names
des jeunes filles dans la foule	young girls in the crowd
pour leur donner la mission	in order to give them the mission
de sauver leur nation ?	of saving their nation ?
ou sont-elles simplement	Or are they simply
des miracles naturels,	miracles of nature,
des sommations muettes	silent calls
de l'inspiration intérieure,	of inward inspiration,
des contre-coups épars et répercutés	scattered and reverberated echoes
de l'impression d'un peuple entier	of the impression of an entire nation
résumant ses souffrances	concentrating its sufferings
dans un seul cœur,	in one single heart,
son cri dans un seul cri,	its cry in one single cry,
et opérant ainsi, par une seule main,	and effecting thus, by one single hand,
le prodige du salut de tous ?	the miracle of the salvation of all ?
L'historien sérieux ne se pose seulement pas	The serious historian does not put to himself only
ces questions et ces doutes.	these questions and these doubts.
S'il réprouve le sarcasme,	If he reproves sarcasm,
cette impiété contre l'admiration,	that sin against admiration,
dont un grand homme a profané son génie	with which a great man (Voltaire) has profaned his genius
en cherchant à profaner,	while seeking to profane

cette pauvre martyre de la patrie,	this poor martyr of the fatherland,
il n'introduit pas dans l'histoire	he does not introduce into history
les puérilités de l'imagination populaire.	the puerilities of the popular imagination.
Le miracle de l'héroïsme est	The miracle of heroism is
plus grand que celui de la légende.	greater than that of fiction.
Il ne le discute pas, il le raconte.	He does not discuss it, he relates it.
La critique tombe	Criticism is disarmed (falls)
devant la sincérité d'un enfant.	before the sincerity of a child.
L'enthousiasme est un feu sacré.	Enthusiasm is a sacred fire.
On n'analyse pas la flamme,	We do not analyse the flame,
on s'y éblouit et on s'y brûle.	we are dazzled and burnt by it.
Volià l'esprit dans lequel	This is the spirit in which
nous allons raconter cette histoire,	we shall relate this history,
plus semblable à un récit de la Bible	resembling rather a story from the Bible
qu'à une page du monde nouveau.	than a page of the new world.

(To be continued.)

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,

Ex-President of the N.U.E.T.

I.

PUPIL Teachers in the later years of their engagement and other candidates in Government Examinations are often required to write short essays on subjects connected with their work, or on questions of general interest. It is found that many students experience considerable difficulty in producing satisfactory compositions in the short time at their disposal in the examination. The object of this series of papers is to provide such help as may be useful in preparing students for these tests. The way in which we propose to render this assistance is to give hints and suggestions for the construction of brief essays in general and for dealing with subjects which have already been, or are likely to be given, as tests in examinations. We intend also to place before our readers each month one specimen essay, which, without any pretension to be a model of perfection, may fairly serve as an example of what would be likely to secure satisfactory marks. At a later stage we hope to arrange for competitions in essay writing, and to offer prizes for the best essays written by our students.

We shall not at the outset lay down a number of general rules for the writing of essays. Such rules as may be desirable will be far better and more serviceable if they are deduced as the results of careful observation of examples and practical attempts to imitate them.

A knowledge of the rules of syntax and the ability to apply them are almost essential to any success in composition, and in the case of pupil teachers may be fairly assumed. On this point we would now only suggest special care in the placing of relative pronouns, and a sparing use of participles.

Punctuation is a matter of some importance, though the practice of good writers is in many respects variable. With regard to the use of stops the careful observation suggested above will form the best foundation for reasonable and consistent practice.

As a means of affording further assistance to our readers, and at the same time exemplifying our idea of the exercise of essay writing, we select as the subject of our first specimen essay—

THE WRITING OF ESSAYS.

The term 'essay' is applied to compositions widely different in their character, in their subject, in their length. It may be worth while to consider what is the true meaning of the term essay, so that we may be able to see how far it is properly applied to these various compositions.

Now, the derivation of a word, though it does not always afford a ready explanation of its current meaning, does very often guide us to the essential element which underlies its different applications. What, then, is the etymology of the word *essay?* It is derived from the Latin *exagium*, a balance, or weighing, and it comes through the Italian *sagio*, and French *essaie.* Thus it is practically the same as our word *assay*, a trial, testing, or examination; and it is interesting to know that formerly the word was pronounced with the accent on the second syllable, as the verb *essay*, to attempt, is still.

Hence we may gather that an essay means properly the consideration and setting forth of what can be said on different sides or different views of a subject in order to weigh and balance these views, and so arrive, or assist in arriving, at a reasonable conclusion. The essays of Montaigne, of Lord Bacon, and other early essayists very closely correspond to this definition; though it should be borne in mind that the writer of an essay towards the elucidation of a subject does not always, perhaps not usually, state his conclusions in any dogmatic, or even definite, form.

Bacon's Essays are unrivalled examples of the condensed expression of thoughts which touch almost all sides of the subjects they deal with. The bright, terse, wise, and witty sayings of which they so largely consist have been called 'texts for thinking, rather than thoughts fully thought out.' The antitheses, in which they abound, show how remarkably they conform to the original idea of the essay, as a balancing and weighing of opinions.

The brevity of most of Bacon's Essays must not mislead us. An essay may be described as less elaborate than a treatise or dissertation; but even such a great work as Locke's Essay on the Human Understanding may, with a wise thinker's modesty, be quite properly named an essay; since it is an attempt or endeavour to analyse and make clear the nature and working of the human intellect.

If we examine the writings of the later essayists—Addison, Steele, Johnson, Charles Lamb, Leigh Hunt, Lord Macaulay, and the eminent reviewers, down to the master critic of our day—Mr. Matthew Arnold—we shall generally find the tentative, deliberative element present in greater or less degree, whether combined with the light and sportive manner of some, or the weighty and learned style of others.

From these considerations we may deduce the following as a fairly serviceable definition:—An essay is a form of literary composition, in which various thoughts on a particular subject are brought together in some connected order with a view to the formation of correct opinions on that subject.

Let us now briefly consider what may be necessary to write a good essay. In the first place we must have knowledge of the subject, or ideas respecting it; and next we must have ability to express our ideas. As to the first of these essentials, we may quote Cobbett's advice, 'Sit down to write what you have thought, and not to think what you shall write.' Success will be most likely to attend the efforts of the essay writer when his pen is guided by a mind full of his subject. This cannot always be secured by the candidates at an examination; but even in that case it will be well for the writer to spend a portion of the available time in thinking carefully over his subject, and in making an outline or skeleton of his essay. Where choice is possible he should, of course, choose the topic on which he knows most. But in order to be able to deal with questions which may be proposed two courses will be specially helpful: one is to store our minds with knowledge, and 'the thoughts of other men;' and the other is to accustom ourselves to reflect on what we read, and hear, and observe. If, in our walks through the streets or fields, we let our minds play round a subject to which we have given attention we shall find hosts of thoughts grouping and arranging themselves for future use.

With regard to such facility in writing as depends on skill in expressing ideas rather than on the possession of thoughts to express, two courses will in this matter also be helpful. First, let the student remember Johnson's advice to anyone who would acquire a pure and easy English style, that he should devote his days and his nights to Addison, and let him spend what time he can spare in reading carefully the works not only of Addison, but of the best writers before and since his time; and then recalling the proverb 'Practice makes perfect,' let him exercise himself frequently in the art of writing brief essays. Reading, observation, reflection, and practical effort are the means by which success may be most surely attained.

(To be continued.)

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music;
Inspector of Singing under the London School Board.

1. The chief object of the suggestions on how to teach singing given in this series of papers will be to afford help to teachers who may need it, in preparing school children to meet the note-singing musical requirements of the Education Department. But as those requirements represent only a minimum standard of *sight-singing* power (no mention of a standard of difficulty is made in connection with the prepared songs) it is absolutely necessary in any rational course to provide for the study of musical and other facts that go beyond, or are not included in the requirements.

2. It should be noted that the requirements (hereafter called the Code) do not pretend to unfold a method of teaching. Roughly, no doubt, the Code does bring in topics and facts in an educational order, but its main purpose is to provide a means of easy examination that can be applied to pupils taught on any method.

3. In these lessons the Tonic Sol-fa Method is used at first, not only because the writer believes it the best for beginners, but because it is most likely to be demanded by those to whom the lessons are addressed. The Staff Notation will be dealt with, if possible, when the explanations in Tonic Sol-fa Notation are completed.

4. The ability of the teacher to sing and pattern all the exercises to be given is assumed. For the most elementary work the standard of ability represented by the elementary certificate of the Tonic Sol-fa College is necessary, and for the higher work the standard of the intermediate certificate is the lowest that can be mentioned. Neither of these examinations tests a teacher's power to teach singing scientifically; they are simply certificates of practical skill and nothing more. Every school teacher who wishes to thoroughly prepare for this subject, and to have his qualification to teach properly tested, should study the course and be examined for the new school teacher's certificate of the Tonic Sol-fa College, the requirements for which go over the whole ground of a school teacher's work so far as singing is concerned.

5. The apparatus required at first is very slight. A good blackboard, a tuning fork, the parts of 'Code Music Drill' and of 'Code Singing Tests'* will provide ample material for a start. Modulators and charts, song books can be added gradually as required. Nearly all the preliminary work can be best done by a teacher using the hand signs and facing the class and occasionally pointing to a written exercise on the blackboard.

6. The Code groups the Standards as follows:—

Div. I. Infants
„ II. Standards I. and II.
„ III. „ III. and IV.
„ IV. „ V. and upwards.

It will be convenient to deal with the requirements of each division in turn.

7. *Infants. To sol-fa the doh chord in any easy order.* An easy order obviously excludes difficulties. The difficult leaps in the doh chord are $\mathbf{d}^{1}$ $\mathbf{m}$—$\mathbf{s}_{1}$ $\mathbf{m}$, and when $\mathbf{s}_{1}$ (lower **s**) has occurred, **s d**. These leaps then are by implication excluded from examinations but they should on no account be omitted from practice. All through the *lessons* the teacher should sing *to* and not *with* pupils. Not only is this plan less exhausting to the teacher but it is the only effective way of reaching pupils' ears and minds. With Infants, the compass to be aimed for should be generally from about C to C^{1} or D^{1}. Some little children can reach higher sounds and cannot get down to C.

8. The first care of a teacher should be to get the children to imitate single sounds or little groups of sounds. All those who are best able to do this should be arranged at the back and those who have bad or indifferent ears should be placed in the front and told to listen. A great deal depends upon the proper musical classification of children in an infant class. If all are allowed to sing always, the best ears and voices are gradually but certainly ruined, whereas if the voices are properly sorted the good ones not only rapidly improve but exert a surprising influence over the other children, so much so indeed that one by one it will be found possible to allow the excluded to join with the others.

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* Code M. D., in four parts, price 2d., and Code S. T., price 4d., in either notation. J. Curwen and Sons.

9. As soon as a reasonable number of the class can be got to imitate sounds or sing little songs, learnt by ear, the systematic teaching of the doh chord may be commenced. The teacher patterns a sound and calls it *doh* (taking care to secure a good vowel), and then in the same manner patterns *soh*. The hand signs are taught, and many exercises given with fresh sounds for *doh*. Ear exercises, such as "how many dohs and sohs do I sing" (teacher sings **d d d s s s**, &c.), now follow. Then *me* is carefully patterned, first as a single tone, then from *soh*, then after **d s**, and on another occasion from **d** (as **d m s**), the hand sign being used throughout. All orders of succession of **d m s** should be practised in several keys, and the names should be boldly written on the blackboard, thus—

soh
me
doh

and the children taught to follow pointing. Appeals to the ear should be constant. The attention of the ear then becomes a habit, and ear exercises to children thus trained become easy when they reach the upper standards. The high doh ($\mathbf{d}^{1}$) will next follow. It is best introduced as a single sound, then from **s** (**d m s** $\mathbf{d}^{1}$), then from **d** (**d** $\mathbf{d}^{1}$), then from **m** (**d m** $\mathbf{d}^{1}$), and afterwards mixed with the other tones in every conceivable way. The leap $\mathbf{d}^{1}$ **m** is difficult in most circumstances in which it occurs. It may be fixed upon the memory by drawing attention to the comparative sadness and quietness of *me*, and contrasting its effect with that of its harder and bolder companion *soh*. A good exercise is to get the class, and afterwards individuals, to undertake to try to sing the *me* after the teacher sings the other tones of the chord in any succession.

10. The thorough teacher must not rest content with teaching the doh chord with only the range **d m s** $\mathbf{d}^{1}$. Using a higher sound for **d**, say F or G, the low soh ($\mathbf{s}_{1}$) should now be introduced, and the range $\mathbf{s}_{1}$ **d m s** systematically worked at. The attraction of the ear to the lowest note hitherto heard in a passage is very great, and especially to low **s**. The leap **s d** will often be sung **s** $\mathbf{s}_{1}$, in such a passage as—

*

d $\mathbf{s}_{1}$ $\mathbf{s}_{1}$ **d m s s m d** $\mathbf{s}_{1}$ $\mathbf{s}_{1}$ **d m s d**

11. Besides the doh chord three songs must be presented in this division. These songs should be taught by ear. There is no objection to their being taught by pattern from the modulator, and it should not be supposed that they must be tunes formed upon the doh chord. They should be *real infant songs*, with a limited compass, and the words should be well within the comprehension of the children. No infant school teacher should allow herself to be persuaded to teach some 'higher' music under the mistaken impression that in this way the taste of the children will be raised. Part singing should not be attempted in the infant class. At most a very easy round that certainly can be sung sweetly and in tune may be introduced for amusement, or a teacher may sing such a round 'against' the class. If part-singing is introduced to an infant class the chances are that many children will acquire a deplorable habit of singing out of tune, and there is absolutely nothing gained to compensate for such a disastrous result. Nowadays there is an enormous literature of good songs for children to choose from. 'The Linnet,' 'The Second Linnet,' 'Infant School Songs' (a unique collection), all published by Curwens, give ample choice. In practising songs the greatest care should be given to the sweetness of the musical tone, and the clear utterance of the words. No singing lesson should last more than about 20 minutes, and if the children's voices are obviously fatigued before that time the lesson should be discontinued.

12. The maintenance of pitch should be the constant concern of the teacher. In singing songs there is not the same objection to the teacher singing with the pupils as there is when exercises are being practised. A teacher with a good clear voice can often keep up the pitch by beginning lines with the children, but she must take care not to allow this practice to become habitual.

(To be continued.)

Our Certificate Class.

BY DR. GEORGE BEACH.

Head Master of Christ Church School, Macclesfield.

THE space at our disposal being somewhat limited, we shall plunge at once '*in medias res*.' Fifteen years' experience in 'coaching' for this Exam. has taught us that in the preparation of these 'hints,' only the most ample knowledge of the subject will suffice. Accordingly the compiler has written to the authorities of twenty of our Training Colleges, requesting their kindly assistance and advice. A most gratifying number of instructive replies, viz., sixteen, has been received (for which hearty thanks are here tendered) supplying information respecting the college 'routines,' the text books used, the relative value of the subjects, and numerous other important points. Appended to this article will be found a list of text books recommended either by the writer or actually in use in the colleges.

When we consider that 'Student in Training' are superintended by able and experienced tutors, can assist one another, are not corporeally jaded and mentally exhausted by five hours daily teaching, are surrounded by an educational atmosphere, are compelled to a certain amount of healthful exercise, are suitably dieted, and constrained to a regular course of living, that their average daily study nominally amounts to six hours, we are apparently forced to the conclusion that none but the most talented and industrious acting teachers can under their manifold disadvantages compete with students in training; nevertheless we can confidently assert that if an acting teacher, ordinarily well informed and of average ability, will conscientiously study from three to three and a half hours daily (including Saturdays) he will be able to pass the Certificate Exam. with credit.

Very few persons can habitually study more than four hours per day, and the average training college student does not really utilise more time. Some of the Lectures he attends are merely 'padding,' some require no intellectual exertion, others are on Religious knowledge, much of his 'private study' time is not used for 'regulation' purposes and he has to spend seventy-five hours during the year in the practising school, whilst his holidays amount to about fourteen weeks per annum.

A critical inspection of the college routines (of which we have now several before us) will show (excluding Music, Drawing, Reading and Religious knowledge) a daily average of three and a half hours of Lecture and two and a half hours of private study.

It is not impossible for the acting teacher to compete against this, as far as time is concerned; what he really needs is TUITION and GUIDANCE, and these in some small measure we intend to supply, particularly in such subjects as Mathematics and Grammar.

Should the candidate, however, be able to procure personal supervision and instruction, he should by all means secure them, and we are sure that few Head Teachers would 'begrudge' a few minutes spent in 'assisting their Assistants' in their studies; but in order to be successful, the student must not attempt 'to cram at the last,' must begin his course betimes, must put his whole soul into the work, must practise much self-denial, and must (next to his school duties) make passing the Certificate Exam. the object of his life during the year 1888.

We do not presume to dictate small rules of life and conduct, for if the student need these, he has not moral and intellectual fibre firm enough to pull him through the struggle; and moreover these rules are not specially applicable to our Exam., yet if any special difficulty assail him, *suitable advice will readily be given him through the medium of these columns.*

A broad path is therefore left wherein to walk, and routines (which have demanded many hours of thought and consultation to compile) both for males and females, are furnished.

They are drawn up on the basis of four weeks' study, and may be serviceably used until the near neighbourhood of the examination.

Towards the compilation of the one for females, several highly qualified and successful Head Mistresses, whose esteemed cooperation throughout the year has been secured, have furnished valuable hints.

<table>
<tr><th>DAY</th><th colspan="12">FIRST WEEK</th><th colspan="12">SECOND WEEK</th><th colspan="12">THIRD WEEK</th><th colspan="12">FOURTH WEEK</th></tr>
<tr><td>Monday.</td><td colspan="4">SCHOOL MANAGEMENT — Organization</td><td colspan="4">EUCLID — The Text</td><td colspan="4">ENGLISH — Paraphrase from Cæsar</td><td colspan="4">EUCLID — Deductions</td><td colspan="4">ENGLISH — Paraphrase from Comus</td><td colspan="4">GEOGRAPHY — England</td><td colspan="4">ENGLISH — Subject Matter of Comus</td><td colspan="4">GEOGRAPHY — Map Drawing</td><td colspan="4">HISTORY — 1837—1880</td><td colspan="4">SCHOOL MANAGEMENT — Formation of Habits and Character</td><td colspan="4">EUCLID — Deductions</td><td colspan="4">GRAMMAR — Study from Text Books</td></tr>
<tr><td>Tuesday.</td><td colspan="4">GEOGRAPHY — Colonies and Dependencies</td><td colspan="4">ARITHMETIC —</td><td colspan="4">HISTORY — Outlines from Text Book</td><td colspan="4">ARITHMETIC —</td><td colspan="4">HISTORY — 1837—1880</td><td colspan="4">SCHOOL MANAGEMENT — Notes of Lessons</td><td colspan="4">GRAMMAR — Study from Text Book</td><td colspan="4">ALGEBRA —</td><td colspan="4">HISTORY — Battles, Treaties, Statutes, etc.</td><td colspan="4">EUCLID — The Text</td><td colspan="4">ENGLISH — Language of Comus</td><td colspan="4">SCHOOL MANAGEMENT — Health (Persons)</td></tr>
<tr><td>Wednesday.</td><td colspan="4">ALGEBRA —</td><td colspan="4">SCHOOL MANAGEMENT — Reasoning</td><td colspan="4">EUCLID — Deductions</td><td colspan="4">ALGEBRA —</td><td colspan="4">EUCLID — The Text</td><td colspan="4">ENGLISH — Composition</td><td colspan="4">EUCLID — Deductions</td><td colspan="4">ENGLISH — Paraphrase from Essays</td><td colspan="4">GEOGRAPHY — I. d and e. (See Syllabus)</td><td colspan="4">GEOGRAPHY — Colonies and Dependencies</td><td colspan="4">MENSURATION —</td><td colspan="4">HISTORY — 1837—1880</td></tr>
<tr><td>Thursday.</td><td colspan="4">ENGLISH — Composition</td><td colspan="4">PENMANSHIP, SPELLING, ETC.</td><td colspan="4">EUCLID — The Text</td><td colspan="4">GEOGRAPHY — Colonies and Dependencies</td><td colspan="4">ARITHMETIC —</td><td colspan="4">HISTORY — Dynasties and celebrated men</td><td colspan="4">ARITHMETIC —</td><td colspan="4">HISTORY — 1837—1880</td><td colspan="4">ALGEBRA —</td><td colspan="4">ENGLISH — Style of Cæsar</td><td colspan="4">ARITHMETIC —</td><td colspan="4">SCHOOL MANAGEMENT — Notes of Lessons</td></tr>
<tr><td>Friday.</td><td colspan="4">ENGLISH — Language of Cæsar</td><td colspan="4">GEOGRAPHY — I. a. b. c. (See Syllabus)</td><td colspan="4">MENSURATION —</td><td colspan="4">ALGEBRA —</td><td colspan="4">SCHOOL MANAGEMENT — Pestalozzi</td><td colspan="4">EUCLID — Deductions</td><td colspan="4">GEOGRAPHY — I. f. (See Syllabus)</td><td colspan="4">EUCLID — The Text</td><td colspan="4">ENGLISH — Composition on Lives of Authors, Language, Style, or Matter of Books</td><td colspan="4">EUCLID — Deductions</td><td colspan="4">ENGLISH — Matter of Essays</td><td colspan="4">GEOGRAPHY — Ireland</td></tr>
<tr><td>Saturday.</td><td colspan="3">HISTORY — Dates and Memorable Events</td><td colspan="3">ENGLISH — Subject Matter of Cæsar</td><td colspan="3">ALGEBRA —</td><td colspan="3">SCHOOL MANAGEMENT — Health (Premises)</td><td colspan="3">ENGLISH — Style of Comus</td><td colspan="3">SCHOOL MANAGEMENT — Registrations and Returns</td><td colspan="3">EUCLID — The Text</td><td colspan="3">MENSURATION —</td><td colspan="3">GEOGRAPHY — Scotland</td><td colspan="3">ARITHMETIC —</td><td colspan="3">HISTORY — Outlines from Text Book</td><td colspan="3">ALGEBRA —</td><td colspan="3">ARITHMETIC —</td><td colspan="3">HISTORY — Dates and Memorable Events</td><td colspan="3">ALGEBRA —</td><td colspan="3">SCHOOL MANAGEMENT — Pestalozzi</td></tr>
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ROUTINE FOR FOUR WEEKS. (FEMALES.)

DAY	FIRST WEEK	SECOND WEEK	THIRD WEEK	FOURTH WEEK
Monday	SCHOOL MANAGEMENT — Organization ANALYSIS AND PARSING — From Cæsar GEOGRAPHY — England	HISTORY — Military and Naval Enterprise ARITHMETIC — GEOGRAPHY — Colonies and Dependencies	DOMESTIC ECONOMY — Food for the Sick SCHOOL MANAGEMENT — Reasoning GEOGRAPHY — Map of Colony or Dependency	ARITHMETIC — GEOGRAPHY — Colonies and Dependencies ENGLISH — Composition
Tuesday	HISTORY — Constitutional Changes ARITHMETIC — ENGLISH — Paraphrase from Cæsar	GEOGRAPHY — Map of England, Scotland, or Ireland DOMESTIC ECONOMY — Expenses NEEDLEWORK — Answering Paper	SCHOOL MANAGEMENT — Health (Premises) ARITHMETIC — GEOGRAPHY — Colonies and Dependencies	HISTORY — Outline from Text Book DOMESTIC ECONOMY — Food in Common Use NEEDLEWORK — Cutting-out
Wednesday	DOMESTIC ECONOMY — Food in Common Use SCHOOL MANAGEMENT — Notes of Lessons NEEDLEWORK — Diagrams	HISTORY — Industrial Condition of People ARITHMETIC — GRAMMAR — From Text Book	GEOGRAPHY — Scotland DOMESTIC ECONOMY — Food in Common Use SCHOOL MANAGEMENT — Pestalozzi	ENGLISH — Subject-matter of Addison NEEDLEWORK — Answering Papers SCHOOL MANAGEMENT — Registration and Returns
Thursday	GEOGRAPHY — Map of Colony or Dependency NEEDLEWORK — Plain ARITHMETIC —	SCHOOL MANAGEMENT — Health (Persons) DOMESTIC ECONOMY — Food in Common Use HISTORY — Literature of the Period	ANALYSIS AND PARSING — From Cæsar HISTORY — Extension of Colonial Possessions ARITHMETIC —	GEOGRAPHY — Ireland DOMESTIC ECONOMY — Food for the Sick ARITHMETIC —
Friday	DOMESTIC ECONOMY — Household Management ARITHMETIC — HISTORY — Extension of Colonial Possessions	ENGLISH — Paraphrase from Cæsar NEEDLEWORK — Cutting-out SCHOOL MANAGEMENT — Notes of Lessons	DOMESTIC ECONOMY — Investments ENGLISH — Composition NEEDLEWORK — Plain	SCHOOL MANAGEMENT — Formation of Habits and Character ENGLISH — Language of Addison HISTORY — Outline from Text Book
Saturday	ENGLISH — Style of Cæsar or Addison HISTORY — Most Important Laws GEOGRAPHY — Colonies or Dependencies PENMANSHIP, SPELLING, ETC.	ARITHMETIC — ENGLISH — Language of Cæsar DOMESTIC ECONOMY — Food for Sick NEEDLEWORK — Plain	ARITHMETIC — ENGLISH — Allusions of Cæsar or Addison NEEDLEWORK — Diagrams HISTORY — Military and Naval Enterprise	GRAMMAR — From Text Book GEOGRAPHY — Colonies or Dependencies ARITHMETIC — SCHOOL MANAGEMENT — Pestalozzi

Several subjects (with which we shall deal more fully hereafter) being omitted from the routine, demand a few words in passing.

1. READING.—This will be heard by H. M. Inspector upon his annual visit to the school. No repetition will be required.

2. TEACHING.—The candidate will be required to teach a class in the presence of H. M. Inspector upon his annual visit.

Three or four 'Notes of Lessons' should be prepared and submitted. Although Inspectors frequently ask for a lesson on an unprepared subject, yet the notes have a good effect upon the mind of the Examiner.

3. SCIENCE.—'*Acting Teachers who attend the Christmas Examination will receive additional marks for any two of the specified science subjects* (for list see Syllabus, Science, Art. 5), *in which they may have obtained a first or second class in the advanced stage or in honours at one of the May Examinations held by the Science and Art Department.*'

No candidate, unless fairly well advanced, should dissipate his energies by attempting to obtain marks for science, but should concentrate his powers upon the subjects given in our routine.

(These marks should, however, have been gained during apprenticeship, or at least some time previous to the candidate's certificate year.)

Magnetism and Electricity, Agriculture or Physiography, according to taste and opportunity, can be recommended, but Mechanics and Animal Physiology should be avoided, as the Examiners are hard to satisfy in the two latter subjects.

4. DRAWING.—'*Annual Examinations in Drawing are held at the various local drawing schools in connection with the Department of Science and Art, at times to be learned from the masters of those schools.*'

Whether drawing should be taken or not depends upon the direction of the candidate's ability. If he can command success with comparative ease, two subjects should be attempted; otherwise our remarks under the head '3. Science,' apply.

5. MUSIC.—This is a very easy and a very pleasant study, and most certainly should be attempted. However, '*Acting Teachers who take the music paper must produce a certificate from some competent person (such as the organist of their church) that they have "such an amount of skill, vocal or instrumental, as is sufficient for the purpose of teaching children to sing from notes."*'

Although the subject does not appear in our routine, we shall treat of it somewhat later on, merely now advising the student to recreate himself with its practice.

Return we now to our routines and their explanation.

We assume that the candidate will devote nineteen hours per week to secure his certificate. A critical examination of the routines will show that in the seventy-six hours per month EVERY SPECIFIED PORTION of the subjects attempted (except in the case of Mathematics), may be attacked. Nor do we consider this method unscientific. It has been our successful plan for all the examinations which our good luck has caused us to be present at; and our position was similar to that of our readers in that we had no tutor, but simply possessed published helps similar (in kind, if higher in degree) to these 'hints.'

By this method too much time is not devoted to favourite subjects; the distasteful ones are not neglected, the parallel lines travelled mutually strengthen each other, and no part of the curriculum is left untouched through miscalculation or an unforeseen loss of time, and the student will be reminded in case the daily quota be neglected. If the candidate think he cannot manipulate so many threads at once, he will find himself, after a fair trial, agreeably mistaken. His faculties will rise to the occasion, his mind, like a generous steed, answer to the call; and he will have developed his abilities, will have educated himself, in addition to acquiring a certificate that he possesses a certain amount of information.

We would here (as a graduate) remark that we estimate the First Division Certificate as highly (if we consider knowledge only) as an ordinary B.A. Degree taken at any university. It is the fault of the Department that it is sometimes not so educational.

MATHEMATICS, however, must be approached in a different way. It is a fabric, built with surprising consistency, brick by brick, story by story, but founded upon an astonishingly few principles. We cannot commence to construct all its stories at once: the beginner is unable simultaneously to study every book of Euclid, or every rule of Algebra.

Notwithstanding, so much of our former principle applies that we may synchronically master the principles and details of its various branches, Arithmetic, Algebra, Euclid, and Mensuration.

The routine is not adapted to a CALENDAR month; by how many days it may exceed the lunar, in those many the student can revise, supplement, and regain lost ground.

In the present article we have not mapped out a syllabus for March, nor subjoined any list of exercises, in order that students who intend following our guidance may have time to obtain a good start in Science and Drawing, to procure the necessary text-books, to free themselves from impeding engagements, to furbish-up rusty knowledge, and to acquire such an acquaintance with the requisite subjects that the April article will find them ready equipped and with loins girded for our educational journey.

ON SUITABLE BOOKS.

A list is given below of works peculiarly suitable to the Certificate course. Most of them are in use at one or more of principal Training Colleges. When possible, procure them interleaved, and for each Text Book provide a companion manuscript-book of suitable size.

Many candidates will probably possess other suitable books not mentioned; but if they are in any doubt as to their utility, we shall be glad to advise.

Don't fail to secure the necessary books, to do so will be as hurtful as 'sparing seed corn.'

LIST.

Males and *Females*.

Miscellaneous.—Heller's Code, Model Answers to Certificate Questions in 'PRACTICAL TEACHER,' Stormonth's or Chambers' Dictionary.

School Management.—Gladman's School Method, Jevon's Logic Primer, Carpenter's School Hygiene, Life of Pestalozzi.

Geography.—Richardson's.

History.—† Ross' Larger History, Curtis' Date Book.

Arithmetic.—Pendlebury's or Hamblin Smith's, Capel's Catch Questions.

English.—Julius Cæsar (Clarendon Press, Interleaved), Macaulay's Addison (Clarendon Press), Marmaduke Hewitt's Mother Tongue, or Daniel's or Smith's Grammar.

Males Only.

Geography. — Cowham's Articles in 'PRACTICAL TEACHER,' 1887 (see under head Miscellaneous) or Findlater's Physiography, Parts I. and II., Philip's Student's Atlas.

History.—Justin Macarthy's Short History of our own times.

Algebra.—Todhunter's Larger, or Hall and Knight's Higher.

Mensuration.—Munn's.

Geometry.—Todhunter's Euclid, Egan's Deductions, Parts I. and II.

Females Only.

Geography.—Faunthorpe's British Colonies, Faunthorpe's Maps of British Empire.

History.—Davies' Manual of Eighteenth Century.

Domestic Economy.—Faunthorpe's Household Science, Carpenter's School Hygiene (see School Management).

Needlework.—Stanley's Needlework Book, Needlework Diagrams for Certificate Exam., 1887, published by Howarth Barnes.

(To be continued.)

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† There are better Histories but none more suitable for this particular purpose, as the Examiners seem to cull their questions therefrom.

Pupil Teacher Examination Papers (Scotland).

28TH JANUARY, 1888.

CANDIDATES.

FIRST PAPER.

(*Two hours and a half allowed for this Paper.*)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Arithmetic.

MALES.

1. If 1 ton 4 cwt. 1 qr. 20 lbs. cost £18, what should 1 ton 8 cwt. 2 qrs. cost?

$$\text{1 ton 4 cwt. 1 qr. 20 lbs.} : \text{1 ton. 8 cwt. 2 qrs.} :: £18 : x$$

$$\text{or 2736 lbs.} \qquad \text{or 3192 lbs.}$$

$$\frac{£18 \times 3192}{2736} = \underline{£21.}\ \text{Ans.}$$

2. If 16 men get £100 in wages for 20 days' work, how much should 5 men get for 12 days' work?

$$\left.\begin{matrix} \text{16 men} : \text{5 men} \\ \text{20 days} : \text{12 days} \end{matrix}\right\} :: £100 : x$$

$$\frac{£100 \times 5 \times 12}{16 \times 20} = \underline{£18\ 15s.}\ \text{Ans.}$$

3. Find by Practice the value of 365 cwt. of tallow at £17 18s. 4d. per cwt.

	£	s.	d.				
	365	0	0	=	cost of 365 cwt. at £1		
			17				
	6205	0	0	=	,,	,,	£17
10s. = ½ of £1	182	10	0	=	,,	,,	10s.
6s. 8d. = ⅓ of £1	121	13	4	=	,,	,,	6s. 8d.
1s. 8d. = $\frac{1}{12}$ of £1	30	8	4	=	,,	,,	1s. 8d.
£	6539	11	8	=	,,	,,	£17 18s. 4d.

4. If £400 gain £30 12s. in 6 months, in what time will £900 gain £25 10s.?

$$\left.\begin{matrix} £900 : £400 \\ 612s. : 510s. \end{matrix}\right\} :: \text{6 mos.} : x$$

$$\frac{\text{6 mos.} \times 400 \times 510}{900 \times 612} = \underline{2\tfrac{2}{9}\ \text{mos.}}\ \text{Ans.}$$

FEMALES.

1. Make out in due form a bill for—

24½ yds. calico, at 8½d. per yd.
3 pieces of silk, each 19¾ yds., at 4s. 3d. per yard
36 pairs of gloves at 3s. 11½d. per pair
40 yds. tape at 6¼d. per dozen yds.

Glasgow, 28th Jan., 1888.

William Fraser, Esq.

Bought of John McCallum.

		£	s.	d.
24½ yds. calico, at 8½d. per yard	... ...	0	17	4¼
3 pieces silk, each 19¾ yds., at 4s. 3d. per yd.	...	12	11	9¾
36 pairs gloves, at 3s. 11½d. per pair	... ...	7	2	6
40 yds. tape, at 6¼d. per doz. yds.	... ...	0	1	8⅚
		£20	13	4⅚

Received payment.

28th Jan., 1888.

John McCallum.

2. Find by Practice the price of 1025 articles at £15 13s. 9¼d. each.

	£	s.	d.				
	1025	0	0	=	price of 1025 arts. at £1 each		
			15				
	15375	0	0	=	,,	,,	£15 ,,
10s. = ½ of £1	512	10	0	=	,,	,,	10s. ,,
3s. 4d. = ⅓ of 10s.	170	16	8	=	,,	,,	3s. 4d. ,,
5d. = ⅛ of 3s. 4d.	21	7	1	=	,,	,,	5d. ,,
¼d. = $\frac{1}{20}$ of 5d.	1	1	4¼	=	,,	,,	¼d. ,,
£	16080	15	1¼	=	,,	,,	£15 13s. 9¼d.

3. Find by Practice the price of 119 tons 7 cwt. 14 lbs. at £2 10s. per ton.

	£	s.	d.			
	2	10	0	=	value of 1 ton	
		119				
	297	10	0	=	,,	119 tons
5 cwt. = ¼ of 1 ton	0	12	6	=	,,	5 cwt.
2 ,, = $\frac{1}{10}$,,	0	5	0	=	,,	2 cwt.
14 lbs. = $\frac{1}{16}$ of 2 cwt.	0	3	1½	=	,,	14 lbs.
£	298	10	7½	=	,,	119 tons 7 cwt. 14 lbs.

4. Find, by Practice, the price of 29 firkins of butter, each 1 cwt. 1 qr. 14 lbs. at £6 10s. per cwt.

	£	s.	d.			
(*a*)	6	10	0	=	price of 1 cwt.	
1 qr. = ¼ of 1 cwt.	1	12	6	=	,,	1 qr.
14 lbs. = ½ of 1 qr.	0	16	3	=	,,	14 lbs.
£	8	18	9	=	,,	1 cwt. 1 qr. 14 lbs.

	£	s.	d.				
(*b*)	29	0	0	=	price of 29 fiks. at £1 each		
			9				
	261	0	0	=	,,	,,	£9 ,,
Deduct 1s. 3d. = $\frac{1}{16}$ of £1	1	16	3	=	,,	,,	1s. 3d. ,,
£	259	3	9	=	,,		£8 18s. 9d. ,,

Grammar.

'If all the misfortunes of mankind *were cast* into a public stock, to be *equally distributed* among the *whole* species, *those* who now think themselves the most unhappy would prefer the share they already possess *before* that which *would fall* to them by such a division.'

1. Parse fully the words in italics.

PARSING.

were—irreg. subst. verb (*am, was, been*), indic., past, 3rd pers., plur., agr. with subj. *misfortunes*; auxiliary of voice to
cast—complete part. pass. of irreg. trans. verb *cast, cast, cast.*
were cast—irreg. trans. verb, pass. voice, indic., past, indef., 3rd pers., plur. agr. with subj. 'misfortunes.'
equally—adv. of manner, mod. *distributed.*
distributed—complete part. pass. of reg. trans. verb, attrib. to 'misfortunes,' and forming part of 'to be distributed,' pres., infin., pass.
whole—quantifying adj., qual. '*species.*'
those—demonstr. adj. pron., mas. or fem., plur. (of that), nom. subj. of '*would prefer.*'
before—prep. showing relation bet. '*would prefer*' and '*that,*' gov. obj. case.
would—irreg. auxil. defec. verb (*will, would*), indic., past., forming with
fall—pot. mood, past, indef., 3rd pers., sing. of irreg. intrans. verb (*fall, fell, fallen*), agr. with subj. '*which.*'

2. What is meant by *regular*, and what by *irregular* comparison of adjectives? Compare the adjectives *ill, nigh, upmost, gay, cruel,* and *first.*

Adjectives are said to be *regularly* compared when to the *positive* degree we add -er or -r to form the *comparative*, and -est or -st to form the *superlative*;—as, positive, *long;* compar., *longer;* superl., *longest.* Pos., *fine;* compar., *finer;* superl., *finest.* When adjectives are not compared according to the rule above, they are said to be *irregularly* compared, as good, better, best.

POS.	COMP.	SUPER.
ill	worse	worst
nigh (*adv.*)	nigher	nighest or next
up (*prep.*)	upper	upmost or uppermost
gay	gayer	gayest
cruel	more cruel	most cruel
fore (*adv.*)	former	first or foremost

3. Analyse the following simple sentences: —

(*a*). I walked through the river on foot.
(*b*). This general has just finished a war of ten years' duration.
(*c*). 'Meanwhile the winged heralds by command
Of sovereign power with awful ceremony
And trumpet's sound throughout the host proclaim
A solemn council.'

SENTENCE	SUBJECT	PREDICATE	OBJECT	EXTENSIONS
(*a*)	I	walked		through the river (place) on foot (manner)
(*b*)	This general	has finished	a war of ten years' duration	just (time)
(*c*)	the winged heralds	proclaim	a solemn council	meanwhile (time) by command of……power (cause) with awful ceremony and …… sound (manner) throughout the host (place)

SECOND PAPER.

(*One hour and a half allowed for this paper.*)

Geography.

1. Name in order the loughs and bays round the coast of Ireland, beginning with Lough Foyle.

Loughs and Bays of Ireland.—Lough Foyle, Belfast Lough, Strangford Lough, Dundalk Bay, Dublin Bay, Waterford Harbour, Youghal Harbour, Cork Harbour, Kinsale Harbour, Bantry Bay, Estuary of Shannon, Galway Bay, Clew Bay, Blacksod Bay, Sligo Bay, Donegal Bay, Lough Swilly.

2. Where, and for what noted, are Southwark, Worcester, Stockport, Coventry, Stoke-upon-Trent, Nottingham, Halifax, Keswick?

Southwark, in Surrey, on S.E. bank of the Thames, forming one of the great divisions of London.

Worcester is the county town of Worcestershire, on the Severn, and noted for china, gloves, lace, leather, &c. Here Cromwell defeated the army of Charles II. in 1651.

Stockport is a town on the Mersey, partly in Cheshire and partly in Lancashire. Cotton manufacture is carried on here on a large scale.

Coventry, a town in Warwick, is celebrated for ribbons and watches.

Stoke-upon-Trent, in Staffordshire, has large manufactures of china, porcelain, and earthenware.

Nottingham, the county town of Nottinghamshire, near the Trent, is the chief seat of the hosiery and lace manufactures, and has large bleaching and dye-works.

Halifax, in the West Riding of Yorkshire, is noted for its woollen manufactures.

Keswick, in Cumberland, is beautifully situated on Derwentwater, and is noted for its manufacture of black-lead pencils from the plumbago mines of Borrowdale. Here Southey, the poet, spent his last days.

3. Describe briefly the physical features of Lanarkshire; mention its industries, and the chief towns engaged in them.

The river Clyde, almost dividing Lanarkshire into two parts, gives the name of Clydesdale to this county, which for judicial and municipal purposes is divided into three *Wards*. The *Upper Ward*, of which Lanark is the chief town, consists mostly of mountains, hills, and moors. Rich seams of coal and lead abound, ironstone is found, and extensive ironworks are in operation. The *Middle Ward*, with Hamilton as chief town, is less hilly and more cultivated, the vale of Clyde being exceedingly picturesque and fertile, and vast quantities of fruit are grown. The *Lower Ward*, though the smallest of the three, is the most important, on account of its being the centre of great manufacturing industries. The chief town in this district is Glasgow, which is not only the largest and most populous city, but it is also the commercial and manufacturing capital of Scotland. Cotton is the staple manufacture, but it has numerous iron-furnaces and large coal and ironworks. It is especially famous for ship-building and the construction of machinery. Other towns engaged in the coal and iron trade are Rutherglen, Airdrie, Wishaw, Coatbridge, Carluke, Motherwell, Calder, Blantyre, Shotts, Coltness, Bellshill, and Baillieston.

History.

1. Name the Regents in the reign of James VI., and state briefly what you know about *two* of them.

The Regents in the reign of James VI. were the Earls Murray, Lennox, Mar, and Morton.

The Earl of Murray, half-brother of Queen Mary, became Regent in 1567, when Mary resigned the throne. When she escaped from Loch Leven Castle, Murray, with four thousand men, defeated her army at Langside. For nearly three years after the flight of Mary, Murray, known as 'the Good Regent,' ruled Scotland vigorously and firmly. His adherence to the Protestant party secured him the support of Elizabeth. In 1569 he went to England to consult with the English Queen and Cecil, her secretary, on the position of Mary. He carried with him all the evidence he could gather of her share in Darnley's murder. Of Murray's enemies in Scotland there were two parties—the Catholics, who were anxious for Mary's return, and the adherents of the House of Hamilton, who being nearest the throne were jealous of Murray's great power. The latter formed a plot against his life, at the head of which was the Archbishop of St. Andrews. On the 3rd February, 1570, the Regent, having to pass through Linlithgow, was riding past a house belonging to the archbishop, when the report of a gun was heard, and a bullet passed through his body. Calmly he alighted from his horse, and walked on foot to his lodging as if he felt no pain, but towards midnight he died.

The next Regent was the Earl of Lennox, father of Darnley. The Castle of Edinburgh was held for the Queen by Kirkcaldy of Grange, with whom was Maitland of Lethington. Kirkcaldy sent a body of four hundred horse to seize Lennox, who was at Stirling. A traitor led them into the town by a secret entrance. They broke into the Regent's house and took him prisoner before any alarm was given. By-and-bye the soldiers rushed down from the castle, and a sharp skirmish followed in which Lennox was shot. (1571.)

2. What part did Albany, Cochrane, and the Earl of Angus take in the reign of James III.?

Albany, brother of James III., being disgusted with the King, schemed with Edward IV. for the giving up of the independence of Scotland, in return for which he was to receive the Scottish crown as Alexander IV. This led to war with England. When the Scottish army reached Lauder, on their march towards England, the nobles resolved to get rid of Cochrane—the King's chief favourite. This man Cochrane was a master builder, who had been created Earl of Mar after the death of the King's brother, who had borne that title. Lord Gray told the story of the mice, the cat and the bell, and the Earl of Angus (son of 'the Red Douglas') said that he would bell the cat; and hence his nickname of Archibald Bell-the-Cat. Cochrane and other favourites were hanged over the bridge of Lander, and the king was taken back to Edinburgh Castle. His brother Albany tried to make himself master of the kingdom, but was driven out of it (1483). In the following year he made a raid on the south of Scotland along with the exiled Earl of Douglas. They were defeated at Lochmaben, and Albany fled to France, where he was slain in a tournament.

3. Describe the character of David II.

David II. resembled his uncle Edward Bruce in being rash and impetuous, as is shown by the anxiety for a rupture with England after his return from France. His wars ending with his capture and captivity in England thus indirectly led to his fondness for English manners and customs. His secret intrigues with Edward III. for the surrender of Scottish independence mark him as a mean, cowardly, and unpatriotic man. His weakness and degeneracy, however, never entirely alienated the people's affection for the grandson of their illustrious deliverer Robert Bruce.

END OF FIRST YEAR.

FIRST PAPER.

(*Two hours and a half allowed for this Paper.*)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word 'Majestically.'

Write in small hand, as a specimen of copy-setting, the sentence, 'Wearing the white flower of a blameless life.'

Arithmetic.

MALES.

1. Simplify $\dfrac{3\cdot5 - 2\cdot1\dot{6}}{\cdot25 \text{ of } (\frac{1}{5} + \frac{1}{7})} \div 15\cdot\dot{5}$

$$\frac{3\cdot5 - 2\cdot1\dot{6}}{\cdot25 \text{ of } (\frac{1}{5} + \frac{1}{7})} \div 15\cdot\dot{5} = \frac{3\frac{1}{2} - 2\frac{1}{6}}{\frac{1}{4}\left(\frac{7+5}{35}\right)} \div 15\tfrac{5}{9}$$

$$= \frac{\frac{21 - 13}{6}}{\frac{3}{35}} \div \tfrac{140}{9}$$

$$= \tfrac{4}{3} \times \tfrac{35}{3} \times \tfrac{9}{140}$$

$$= \underline{1.} \text{ Ans.}$$

2. Find the value of ·00125 ton + ·0125 cwt. + ·025 lb., and reduce the result to the decimal of 2 qrs. 9 lbs.

(*a*) ·00125 ton = ·00125 × 2240 lbs. = 2·8 lbs.
·0125 cwt. = ·0125 × 112 = 1·4 ,,
·025 lbs. = ·025 lbs.
4·225

(*b*) $\dfrac{4\cdot225 \text{ lbs.}}{2 \text{ qrs. } 9 \text{ lbs.}} = \dfrac{4\cdot225}{65} = \underline{\cdot065}$ Ans.

3. If the 4½ lb. loaf is sold for £·025 when wheat is 6s. a bushel, what should be the price of 1 cwt. 1 qr. 10 lbs. of bread when wheat is £3·6 per quarter?

$$\left.\begin{matrix} 4\frac{1}{2}\text{ lbs.} & : & 1\text{ cwt. }1\text{ qr. }10\text{ lbs.} \\ \text{or} & & \text{or} \\ 9\text{ half lbs.} & : & 300\text{ half lbs.} \\ 48\text{s.} & : & 72\text{s.} \end{matrix}\right\} :: £\cdot025$$

$$\frac{£\cdot025 \times 300 \times 72}{9 \times 48} = \frac{6\text{d.} \times 300 \times 72}{9 \times 48} = 300\text{d.} = \underline{25\text{s.}} \text{ Ans.}$$

4. An ordinary train leaves Dundee at 10 a.m., and travels at the rate of 30 miles an hour; an express train leaves Dundee at 11·15 a.m., and travels on the same line at the rate of 45 miles an hour; where will the second train overtake the first?

(*a*) By 11·15 the first train has gone 30 mls. × 1¼ = 37½ mls.

(*b*) The second gains 15 mls. on the first per hour.

15 mls. : 37½ mls. :: 1 hour : 2½ hours

(*c*) The second therefore overtakes the first in 2½ hours, and the first is therefore (45 mls. × 2½ =) 112½ mls. from Dundee.

FEMALES.

1. Find by Practice the value of 63 tons 16 cwt. 1 qr. 8 lbs. at £11 13s. 4d. per ton.

	£	s.	d.			
	11	13	4	=	value of	1 ton
			7			
	81	13	4		,,	7 tons
			9			
	735	0	0	=	,,	63 ,,
10 cwt. = ½ of 1 ton	5	16	8	=	,,	10 cwt.
5 ,, = ½ of 10 cwt.	2	18	4	=	,,	5 ,,
1 ,, = ⅕ of 5 ,,	0	11	8	=	,,	1 ,,
1 qr. = ¼ of 1 ,,	0	2	11	=	,,	1 qr.
8 lbs. = $\frac{1}{14}$ of 1 ,,	0	0	10	=	,,	8 lbs.
	744	10	5	=	,,	63 tons 16 cwt. 1 qr. 8 lbs.

2. If 7 men mow 37 acres in 3 days, working 8 hours a day, how many men could mow a field of twice the size in 7 days, working 4 hours longer each day?

$$\left.\begin{matrix} 1\text{ field} & : & 2\text{ fields} \\ 7\text{ days} & : & 3\text{ days} \\ 12\text{ ho.} & : & 8\text{ ho.} \end{matrix}\right\} :: 7\text{ men} : x$$

$$\frac{7\text{ men} \times 2 \times 3 \times 8}{1 \times 7 \times 12} = \underline{4}\text{ men. Ans.}$$

3. A garrison of 750 soldiers has provisions to last 33 days, but a change is made in the number of soldiers, and the provisions are exhausted in 22 days 12 hours. What was the change made?

22½ days : 33 days :: 750 men : x

$$\frac{750\text{ men} \times 33}{22\frac{1}{2}} = \frac{750 \times 66}{45} = \underline{1100}\text{ men.}$$

350 men must have been added to the garrison.

Grammar.

'I must not *omit* that the benevolence of my good old friend, which flows out towards every *one* he converses *with*, *made* him very kind to our interpreter, whom he looked upon as an extraordinary man, for *which* reason he shook him by the hand at parting, telling him that he should be very glad to see him at his lodgings in Norfolk Buildings, and *talk* over these matters with him *more* at leisure.'

1. Give the general analysis of the above passage, pointing out the different clauses, and stating the relation which they bear to one another.

2. Parse, fully, the words in italics.

GENERAL ANALYSIS.

SENTENCES	KIND	SUBJECT	PREDICATE
1. I must not omit	principal	I	must not omit
2. (that) the benevolence of my old friend made him very kind to our interpreter	sub. noun sent. to (1) obj. of 'omit'	the benevolence......friend	made......to our interpreter
3. which flows out towards every one	sub. adj. sent. to (2) qual. 'benevolence'	which	flows......every one
4. (whom) he converses with	sub. adj. sent. to (3) qual. 'one'	he	converses with (whom)
5. whom he looked upon	sub. adj. sent. to (2) qual. 'interpreter'	he	looked upon (whom)
6. as an extraordinary man (is looked upon)	sub. adv. sent. to (5) mod. 'looked'	an extraordinary man	(is looked upon)
7. for which reason he shook him by the hand at parting telling him	princ. sent. in cop. co-ord. with the preceding complex sent.	he	shook him......him
8. (that) he would be very glad to see him at his lodgings in Norfolk Buildings and to talk over these matters with him more at leisure	sub. noun sent. to (7) object of 'telling'	he	would be......leisure

PARSING.

omit—reg. trans. verb, infin., pres., forming with 'must' pot. pres., 1st pers., sing., agr. with subj. 'I.'
one—indef. pron., mas. or fem., sing., 3rd pers., obj., gov. by 'towards.'
with—prep. showing relation between 'converses' and (whom)
made—irreg. trans. verb (*make*, *made*, *made*) indic., past, indef., 3rd pers., sing., agr. with subj. 'benevolence.'
which—dist. adj. qual. 'reason.'
talk—reg. intrans. verb, infin., pres., gov. by 'glad.'
more—adv. of degree mod. 'at leisure.'

3. Define and classify the various kinds of pronouns with examples.

TABLE OF PRONOUNS.

(1) *Personal Pronouns* are these which designate the person speaking or the person addressed without naming that person, as I, thou, we, you.

(2) *Demonstrative Pronouns* enable us to avoid the repetition a noun already used, as he, she, it, they.

(3) *Relative Pronouns* have a reference to some word or phrase preceding, as who, that, which.

(4) *Interrogative Pronouns*, used in asking questions, as who? which? what?

(5) *Indefinite Pronouns*, used without any limitation, as one, *e.g.* 'one cannot say.'

(6) *Reflective Pronouns* have a backward reference to the subject, as self, selves.

(7) *Adjective Pronouns* are so called because they qualify nouns like adjectives, and are also used pronominally when standing by themselves, as, *possessives*, my, thy, his; *distributive*, each, every; *demonstrative*, this, that; *indefinite*, some, any, all, such.

SECOND PAPER.

(*Two hours allowed for this paper.*)

Geography.

1. Draw a map of France, indicating the mountain and river systems.

2. Describe carefully the course of the Rhine or the Danube. Name, in either case, the leading tributaries.

The *Rhine*, taking its main source in Mt. St. Gothard, passes through the valley of the Rheinwald, unites with a second headstream, and flows through a beautiful valley into L. Constance. After leaving this lake it forms the falls of Schaffhausen, and winding between lofty rocks is joined by the *Aar*, and reaches Basle. At this town the river turns north, flowing through a rich open valley, and before reaching Mentz is joined by the *Neckar*, from the Black Forest, and the *Mayne*, from the Fichtelberg, in the N.E. of Bavaria. After leaving Mentz it flows west through an unbroken series of picturesque scenery, and then turns N.W. till it reaches Holland. Before this, however, it is joined by the *Moselle*, from the Vosges Mountains, on the left, and by the *Lahn*, *Ruhr*, and *Lippe*. Entering Holland, it divides into two branches, the *Waal* and *Rign* (Rhine). The former flows W. and joins the *Maas*, whilst the latter flows N.W., and after dividing into several branches falls into the North Sea below Leyden. Just after entering Holland it throws off the *Yssel*, which falls into the Zuyder Zee, and halfway between Utrecht and Leyden the *Amstel* leaves the mainstream and flows into the estuary called the Y. The delta of the Rhine is the largest in Europe, and the river is at least 800 miles long.

3. Where, and for what noted, are Milan, Strasburg, Constance, Naples, Upsala, Stettin, Rheims.

Milan, in Lombardy, Italy, in the centre of a rich plain between the Adda and Ticino, is situated at the focus of the chief passes leading from the north of Italy across the Alps, and hence an important centre of trade between Italy and central Europe. Its manufacturing industry is very highly developed, and its marble cathedral is also celebrated.

Strasburg, a German town near the left bank of the Rhine, is the chief town of the Imperial territory of Alsace-Lorraine, and the seat of a university very richly endowed since the province in which it lies was acquired by Germany. It has a famous clock.

Constance stands on Lake Constance, which lies between Germany and Switzerland. It is well fortified, and is famed for the council which sentenced Huss and Jerome, of Prague, to be burned.

Naples, in Italy, is situated on the beautiful bay of Naples, and is the most populous city in the kingdom. It is very ancient, is the principal seaport of southern Italy, and the centre of its learned institutions. It is close to Vesuvius, whose eruption in A.D. 79 buried Pompeii and Herculaneum.

Upsala, in Sweden, was the former capital, and has a far-famed university, in which Linnæus and Scheele were professors.

Stettin is a populous and fortified city at the mouth of the Oder, in Germany. Next to Danzig it is the chief seaport, with shipbuilding and numerous manufactures, the chief of which is woollen.

Rheims, in France, the principal seat of the woollen manufacture, is renowned for its opposition to the episcopal tyranny in the middle ages. In its cathedral many of the French kings were crowned.

History.

1. Name any rebellions in Ireland, and give a short account of one of them.

In 1641 the Irish taking advantage of the disordered state of England rose in insurrection and massacred nearly 40,000 Protestants.

At the revolution in England most of the Irish took part against William III. and again rose in a rebellion which lasted from 1689 to 1692.

Another outbreak occurred in 1798. In 1791, at Belfast, a society called 'The United Irishmen' was formed with the real purpose of separating Ireland from the British Empire. A secret correspondence was kept up with France; and, when all seemed ready, a day was fixed for the outbreak of rebellion. But the Government, receiving timely warning, seized the ringleaders, among whom was Lord Edward Fitzgerald. Then an aimless rising took place, slightly in the north, but fiercely and cruelly in the south. For four months it raged in Wicklow and Wexford, ending with the fight at Vinegar-hill near Enniscorthy, where General Lake routed the great mass of the rebel army, 1798. When all was ended 900 Frenchmen landed at Killala Bay, only to surrender in less than a month at Carrick-on-Shannon.

Another rising occurred in 1803, but it was suppressed in a single night.

A feeble rising took place under O'Brien in Tipperary, 1848. The treasonable plottings of the Fenians culminated in 1865.

2. What events led to the dethronement of James II.? Describe his character.

James's policy was directed to the attainment of two ends—the restoration of Catholicism and the establishment of absolute power. To obtain these he required a new High Commission Court to ensure ecclesiastical supremacy, a settled revenue, a standing army, and the repeal of Habeas Corpus, and the Test Act. He soon obtained the first; Parliament had granted him the second; it allowed him to raise the army to 20,000 men; but refused to yield him the last. Claiming the double power of *suspending* and of *dispensing with* any law he chose, he, accordingly, notwithstanding the Test Act, began to officer his troops with Catholics and to appoint them to the highest offices in the state. He followed this up by demanding that a Declaration of Indulgence, suspending the penal laws against Nonconformists and Catholics, should be read by every clergyman on two successive Sundays.

Seven bishops who petitioned against it were arrested, and while they were waiting for the trial tumults were rife all over the country, and the men of the west were prepared to take arms. The accused were finally acquitted on the grand constitutional ground that the *dispensing power claimed by the king was illegal*. Great rejoicings were held when the news of the acquittal spread abroad.

The birth of a son to James at last brought matters to a crisis. Fears for a Catholic succession caused the nobles and clergy of England to send a letter to William of Orange, entreating him to come with an army and aid them in defending their freedom and faith. Accepting the invitation, William landed at Torbay in November, 1688. In less than two months James fled to France, and William was received in London with the greatest enthusiasm.

James II. was reckless and self-willed. Like all the Stuarts, he firmly believed in the Divine Right, and that he therefore could rule his people as he pleased. His zeal for the Roman Catholic religion, strengthened and sharpened by the thirst for absolute power, cost him the throne. His perversity and petty spite, his childishness and meanness, overshadow that diligence and punctuality in the despatch of business for which he has been admired.

Composition.

1. Write the substance of the passage read to you; or

2. Write a letter on 'Early Rising,' or, 'A Day's Fishing.'

Glasgow, 28th Jan., 1888.

SIR,

There is an oft-quoted couplet that parents have tried to engrave on the tablet of childhood's brain, namely,

'Early to bed, and early to rise,
Makes a man healthy, wealthy, and wise.'

And we have many stories told of eminent men who have attributed their position in life to the habit of early rising.

The sluggard is depicted in the Proverbs of Solomon as an incorrigible lie-a-bed, and the industrious woman is beautifully pictured as rising while it is yet night, and giving meat to her household.

It is undoubtedly true that sleep is refreshing, but over-indulgence enfeebles the body and ultimately the brain. The student who pores over his studies till late at night cannot compete with the one who, retiring at a timely hour, leaves his couch at early morning and begins his work with a fresh and healthy brain. It has been said by physicians that six hours' sleep are sufficient for all purposes of health, but what should we say of those who have not the self-denial to do with less than nine or ten? Protracted sittings at night are beginning to be abolished, and properly so, too, by members of Parliament, as a rule has been recommended for adjourning shortly after midnight.

In the country, farmers and others who are proverbially healthy are accustomed to be up and out by six o'clock at the latest, the clocks being so regulated that they show time at least half-an-hour before Greenwich, so that the servants may be at work as early as possible.

We find among our scholars that the best results are obtained in those subjects that are attacked first in the day, when the mind is vigorous; and the teacher has often remarked that if, in summer, work was begun at 7 a.m., and finished by 1 p.m., brilliant results would be got.

I am, Sir,
Your obedient servant,
JAMES SCOTT.

END OF SECOND YEAR.

FIRST PAPER.

(*Two hours and a half allowed for this paper.*)

Dictation.

Write from dictation in a neat hand with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of Copy-setting, the word 'Majestically.'

Write in small hand as a specimen of Copy-setting, the sentence 'Wearing the white flower of a blameless life.'

Arithmetic.

1. Find the difference between simple and compound interest on £1,350 for 3 years at 4 per cent.

(*a*) Simple Interest $= \dfrac{£1350 \times 3 \times 4}{100} = £162$

(*b*) Compound Interest

4 p. c. gives $\frac{1}{25}$ of prin. as interest

£1350	Principal for 1st year.
54	Interest ,, ,,
1404	Principal for 2nd ,,
56·16	Interest ,, ,,
1460·16	Principal for 3rd ,,
58·4064	Interest ,, ,,
1518·5664	Amount for 3 years.
1350	
£168·5664	Interest ,,
20	
11·328	
12	
3·936	

	£	s.	d.	
Compound Interest =	168	11	3·936	
Simple ,, =	162	0	0	
∴ The difference =	6	11	3·936.	Ans.

2. What sum will amount to £4326 8s. in 2 years at 4 per cent. compound interest?

(*a*) Compound interest of £100 for 2 years at 4 per cent. = £8·16

$$\begin{array}{lcccc} & \text{amt.} & \text{amt.} & \text{prin.} & \text{prin.} \\ (b)\ \therefore & £108{\cdot}16 : & £4326{\cdot}4 :: & £100 : & x \end{array}$$

$$\frac{£100 \times 4326{\cdot}4}{108{\cdot}16} = \underline{£400.} \quad \text{Ans.}$$

3. Goods are sold for £728 at a loss of 9 per cent.; at what price would they have gained 7 per cent.

91 : 107 :: £728 : price required.

$$\frac{£728 \times 107}{91} = \underline{£856.} \quad \text{Ans.}$$

FEMALES.

1. Explain, as if to beginners, how it comes that $\frac{3}{5}$ is equal to $\frac{12}{20}$.

In $\frac{3}{5}$ the unit is divided into 5 equal parts of which 3 are taken.

In $\frac{12}{20}$ the same unit is divided into 20 equal parts of which 12 are taken.

But 1 division in the first is equal to 4 in the second.

Therefore $\frac{3}{5} = \frac{12}{20}$ or

It will be seen that multiplying $\frac{3}{5}$ by $\frac{4}{4}$ we get $\frac{12}{20}$.

Now $\frac{4}{4} = 4 \div 4 = 1$ and multiplying by 1 does not change the value of any number.

$$\text{or, } \tfrac{12}{20} \text{ of } £1 = 12\text{s. and } \tfrac{3}{5} \text{ of } £1 = 12\text{s.}$$

$$\therefore \tfrac{12}{20} = \tfrac{3}{5}.$$

2. Simplify $\dfrac{(\frac{1}{3} \text{ of } 2\frac{1}{7}) + (\frac{4}{5} \text{ of } 3\frac{1}{4})}{(\frac{9}{7} \times 3\frac{1}{2}) - (2\frac{1}{5} \div 1\frac{4}{7})}$

$$\frac{(\frac{1}{3} \text{ of } 2\frac{1}{7}) + (\frac{4}{5} \text{ of } 3\frac{1}{4})}{\frac{9}{7} \times 3\frac{1}{2} - (2\frac{1}{5} \div 1\frac{4}{7})} = \frac{(\frac{1}{3} \times \frac{15}{7}) + (\frac{4}{5} \times \frac{13}{4})}{(\frac{9}{7} \times \frac{7}{2}) - (\frac{11}{5} \times \frac{7}{11})}$$

$$= \frac{\frac{5}{7} + \frac{13}{5}}{3 - 1\frac{2}{5}}$$

$$= \frac{\frac{25 + 91}{35}}{\frac{8}{5}}$$

$$= \frac{116}{35} \times \frac{5}{8}$$

$$= 2\tfrac{1}{14}. \quad \text{Ans.}$$

3. After selling $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{5}$ of his estate a gentleman still retains property to the value of £10,000. What was the original value of his property?

(*a*) $\frac{1}{3} + \frac{1}{4} + \frac{1}{5} = \frac{20 + 15 + 12}{60} = \frac{47}{60}$

(*b*) after selling $\frac{47}{60}$ he has $\frac{13}{60}$ of the estate left

(*c*) ∴ the whole estate $= \frac{£10000 \times 60}{13}$

$= £46,153\ 11\text{s. } 11\frac{1}{3}\text{d.}$ Ans.

4. A and B can do a piece of work in 3 days; B and C in 4 days; A and C in 5 days. In what time can they do it working together?

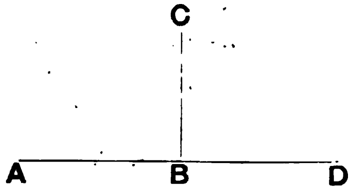
A and B do $\frac{1}{3}$ or $\frac{20}{60}$ in 1 day
B and C „ $\frac{1}{4}$ or $\frac{15}{60}$ „
A and C „ $\frac{1}{5}$ or $\frac{12}{60}$ „
∴ A + B + C „ $\frac{47}{60}$ in 2 days since each is reckoned twice.

And so A, B, C, will do $\frac{47}{120}$ of the work in 1 day, or they will do the whole in $\frac{120}{47}$ days $= 2\frac{26}{47}$ days.

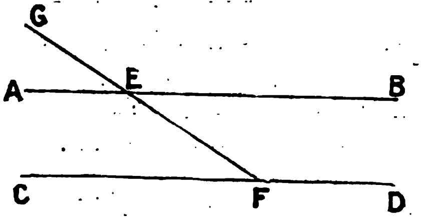
Euclid.

1. Define *adjacent*, *alternate*, and *exterior* angles, respectively.

Adjacent angles are those which are made by one straight line standing upon another; thus ABC, DBC are adjacent angles.



Alternate angles are those lying on opposite sides of a straight line meeting two parallels, but not adjacent to one another: thus, BEF, EFC are alternate angles.

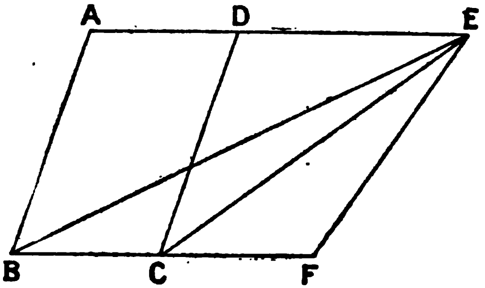


Exterior angles are those made by the production of the side of any rectilineal figure, or of a line meeting two parallels, thus, BEG.

2. Parallelograms upon equal bases and between the same parallels are equal.

Euclid, Book I., Prop. 36.

3. If a triangle and a parallelogram are between the same parallels, and the base of the triangle is double the base of the parallelogram, show that the triangle is equal in area to the parallelogram.



Let the triangle EBF and the parallelogram ABCD be between the same parallels AE and BF, and let BF the base of the triangle EBF be double of BC the base of the parallelogram ABCD, then the triangle EBF = the parallelogram ABCD.

Join CE. Then the triangle EBC is equal to the triangle ECF because they are on equal bases BC, CF and between the same parallels AE, BF, and therefore the triangle EBF is double of the triangle EBC. But the parallelogram ABCD is also double of the triangle EBC (I. 41.) Therefore the triangle EBF is equal to the parallelogram ABCD.

Grammar.

Endure their fiery eyes as *best* you *may*, and ride on slowly and reverently, for, *facing* you from the side of the transom, *that* looks *longwise* through the street, you see the one glorious shape transcendent in its beauty; you see the large eyes set and self-relying *as* the eyes of a conqueror, with *all* the rich shadows of thought lying darkly *around*.

1. Give the general analysis of the above passage, naming the different clauses.

2. Parse the words in italics.

GENERAL ANALYSIS.

SENTENCES AND CLAUSES	KIND	SUBJECT	PREDICATE
1. Endure their fiery eyes	Principal	you	endure......eyes
2. [as] best you may (endure)	sub. adv. clause to (1) (manner)	you	(may best endure)
3. [for] facing you from the transom, you see the one glorious shape transcendent in its beauty	sub. adv. clause (reason) to (1)	you	see the one glorious shape, &c., facing . . . transom
4. that looks longwise through the street	sub. adj. clause to (3) qual. 'transom'	that	looks, &c...... street
5. You see the large eyes set and self-relying with all the rich shadows of thought lying darkly around	Principal	you	see the large..... around
6. [as] the eyes of a conqueror (are set and self-relying)	sub. adv. clause (manner) to (5)	the eyes of a conqueror	are set.... relying

PARSING.

best—adv. of manner, superl. deg. (*well, better, best*) mod. 'may (endure)'

may—irreg. aux. def. verb (*may, might*) indic., pres., indef., 2nd person., pl., agr. with 'you' and forming with (endure) pot., pres., &c.

facing—reg. trans. verb, pres. or incompl. part., qual. 'transom.'

that—simple rel. pron., anteced. 'transom,' 3rd pers., sing., neut., nom., subj. of 'looks.'

longwise—adv. of manner, mod. 'looks.'

as—subord. conj. or conj. adv., introducing a subord. adv. sent and mod. 'are set, &c.'

all—pronom. adj., indef. num., qual. 'shadows.'

around—adv. of place mod. 'lying.'

3. Explain in your own way the construction of the following sentences:—

(*a*) The boy stood on the burning deck
Whence all but he had fled.
(*b*) He does everything but what he ought.
(*c*) I had rather go than stay.

(*a*) 'But' is here properly a preposition and the line should read 'all but *him*.' Those who consider it a conjunction might fill up the ellipsis thus:—'Whence all had fled but he (had not fled).'

(*b*) Here the preposition 'but' with the noun clause 'what he ought' forms a limiting adjunct to 'everything.'

(*c*) Some say that 'had' is equivalent to 'would' others again defend 'had' as being correct and similar to the construction, 'I had as lief not be as live to be in awe of such a thing as I myself.'

SECOND PAPER.

(*Two hours and a half allowed for this paper.*)

Geography.

1. Draw a map of the Dominion of Canada. What parts of British North America are not embraced in the above? Why?

Newfoundland is not included in the Dominion because it has hitherto held aloof from the Confederation.

2. Give some account of the gold-fields of Australia.

In 1845 Sir Roderick Murchison predicted that from the resemblance which the Australian Mountains bore to the Ural Mountains, the rocks would be found to be gold producing. Some six years afterwards Hargraves discovered extensive deposits of the precious metal at Bathurst and Wellington in New South Wales. Since that time very valuable and extensive gold-fields have been found in various localities but especially in Victoria. Very little gold has as yet been found in South or West Australia, but in Queensland gold is particularly plentiful. In 1862 at the International Exhibition held in London a gilded pryamid was exhibited representing the quantity of gold exported from Victoria, from 1851 to 1861. It was 45 feet high, 10 feet sq. at its base, and contained 1,492 cubic ft. It represented a value of nearly 105 million pounds sterling.

3. Write short notes on each of the following:—Penang, St Helena, Norfolk Island, Bhamo, Point de Galle, and Hong-Kong.

Penang is an island of the west coast of the Malay Peninsula, densely wooded, rich in tropical produce, very healthy, being a resort for invalids. *Penang* is the name for the betel-nut which the island produces, hence its name.

St. Helena, an island in the South Atlantic belonging to Britain, rises abruptly from the ocean to a height of nearly 3000 ft., famous as the prison of Napoleon from 1815 to his death in 1821; place of call for ships for water and provisions.

Norfolk Island, an island in South Pacific, formerly a penal settlement, now peopled by a few of the descendants of the mutineers of the 'Bounty' who were brought from Pitcairn Island in 1856.

Bhamo, in Burmah, is a prosperous town and the chief seat of the commerce with China, exporting salt, rice, &c., and importing cotton, woollen, and silk goods.

Point de Galle, in Ceylon, is an important station for steam packets, and has an excellent harbour.

Hong-Kong, on the coast of China, though small, rocky, and barren, is a valuable possession of Britain on account of its political and defensive position; ceded to Britain 1842.

History.

1. Give a short account of the Popish Plot with dates.

This pretended plot (1678) was the fabrication of a dissolute clergyman called Titus Oates. He swore information before Sir E. Godfrey that the Catholics were plotting to assassinate Charles II. and purposing to place the Duke of York on the throne; that the city of London was to be set on fire, and the Protestants everywhere to be massacred; and if James, Duke of York, refused to accept the crown, or did not fulfil the conditions imposed upon him, he was to be put to death.

Oates's story was at first credited, and he was rewarded with a pension of £1200 and apartments in Whitehall, till a reaction took place, when he was fined £100,000 for libel, and imprisoned for non-payment; he was whipped at the cart's tail under James II., but pardoned and rewarded under William III.

2. Give an account of the part taken by the Scotch in the Civil War.

Under the terms of the Solemn League and Covenant, made between the Scotch and English Parliaments, 21,000 Scottish troops crossed the borders in the beginning of 1644. These were in time to aid the Roundheads to gain the victory of Marston Moor. In Scotland the Marquis of Montrose, who fought for Charles, gained six successive victories, and appeared to be getting the complete mastery of that kingdom, when Leslie scattered his army at Philiphaugh, 1645. This defeat, combined with the overthrow at Naseby in the same year, caused Charles to fling himself on the mercy of the Scottish army stationed at Newark. They received him respectfully and promised to fight for him if he would sign the National Covenant. He refused to do this; and after some time by his own desire he returned to his English subjects.

The Scots, on hearing of the treatment the King was receiving from Cromwell and the Independents, re-crossed the border under the Duke of Hamilton, but Cromwell met and defeated them at Preston. A government was soon established at Edinburgh hostile to Charles.

After Charles's execution the Scots rose in favour of Charles II., but Cromwell quelled them at Dunbar, 1650.

Composition.

Write full notes of a lesson to an advanced class on 'The Horse,' or 'Farming.'

FARMING.

(*a*) *Introduction.*—Draw from class the important place which agriculture holds, our dependence upon farming and the farmer for food, clothing, &c. If in a city school, ask how many have visited a farm in the country; rouse their interest by a short description of farming operations at various seasons of the year. Show the value of agricultural knowledge to emigrants from this country.

(*b*) *Definition.*—A farm is a portion of land set apart for cultivation either by the proprietor or by a tenant, who pays a certain rent. (*Point out the easy conditions on which land is given to colonists, and the advantage of emigration to those who have some capital.*)

(*c*) *Taking a farm.*—Capital required; not advantageous for either landlord or tenant unless he can command a sum in proportion to the extent of land very rich land requiring less capital in proportion to the rent than poor land; consider condition and fertility of soil both as to nature and how it was left by former occupant; inquiries to be made as to the convenient situation of the farm; disposition of fields; adaptation of buildings; roads to fields; distances; convenience of good pasture; abundance of good water; and consequently the offer of a fair rent; lease; the benefit of a 19 years' lease.

(*d*). *Buildings.*—Show by diagram disposition of dwelling-house (*speak of house suited to the wealth of occupant*); court; dairy sheltered yards; barns; cartsheds; haysheds; stack-yard; stores for various produce; arrangement for collecting manure.

(*e*) *Implements.*—Ploughs; harrows, &c.; reaping-machines; raking-machines; thrashing-machines, &c.

NOTE.—Use black-board freely for headings, notes, and illustrations.

Latin.

FIRST STAGE.

(*The answers to be written on a separate paper*).

1. Give, with examples, the rules for the comparison of adjectives and adverbs. Compare *bene*, *dives*, *malus*, *nequam*, *diu*, *magnus*, and *sæpe*.

Adjectives in Latin form their comparative by adding -ior, and their superlative by adding -issimus to the stem after the removal of its final vowel, as:

POSITIVE.	COMPAR.	SUPERLATIVE.
Superbus (stem, superbo)	superbior	superbissimus
Tristis (stem, tristi)	tristior	tristissimus
Sapiens (stem, sapienti)	sapientior	sapientissimus

Adjectives ending in *er* drop the *e* in forming the comparative when they drop it in the oblique cases; but they form the superlative by adding *rimus* to the nominative singular, as:

POSITIVE.	COMPARATIVE.	SUPERLATIVE.
Acer	acrior	acerrimus
Liber	liberior	liberrimus
Miser	miserior	miserrimus

Adverbs derived from adjectives or participles in comparison follow the peculiarities of the words from which they are derived. The comparative generally in -us, corresponding to the neuter of the adjective; and the superlative is formed from the superlative of the adjective by changing -us into -e, as: alte, altius, altissime; male, pejus, pessime.

POSITIVE.	COMPARATIVE.	SUPERLATIVE.
Bene	melius	optime
Dives	ditior	ditissime
Malus	pejor	pessime
Nequam	nequior	nequissimus
Diu	diutius	diutissime
Magnus	major	maxime
Sæpe	sæpius	sæpissime

2. Decline together velox illa navis; and give the infinitives of the verb *to be*; and the participles, active and passive, of the verb *to teach*.

	SINGULAR.			PLURAL.		
Nom.	Velox	illa	navis	Veloces	illae	naves
Gen.	Velocis	illius	navis	Velocium	illarum	navium
Dat.	Veloci	illi	navi	Velocibus	illis	navibus
Acc.	Velocem	illam	navem	Veloces	illas	naves
Abl.	Veloce or i	illa	nave	Velocibus	illis	navibus

Infinitives of the verb 'to be' (esse):—

Pres. and Imperf.	Esse, *to be.*
Future	Futurum-am-um esse, or fore, *to be about to be.*
Perf. and Pluperf.	Fuisse, *to have been.*
Future Perfect.	Futurum-am-um fuisse, *to have been about to be.*

Participles of the verb 'to teach' (docere):—

ACTIVE.

Present.	Docens, *teaching.*
Future.	Docturus-a-um, *about to teach.*

PASSIVE.

Perfect.	Doctus-a-um, *taught.*
Gerundive.	Docendus-a-um, *deserving, or requiring to be taught.*

3. Translate into English and parse the following words in italics:—

(*a*) Servus *puero corpus monstrabat.*
(*b*) *Portas* urbis cives clauserant.

TRANSLATION.

(*a*) The slave was showing the body to the boy.
(*b*) The citizens had shut the gates of the city.

PARSING.

Puero	dat., sing., mas., noun of 2nd decl., puer-i, governed by 'monstrabat.'
Corpus	acc., sing., neut., noun of 3rd decl., corpus-oris, gov. by 'monstrabat.'
Monstrabat	reg. verb, 1st conj., monstro-avi-atum-are, indic., imperf., 3rd pers., sing., agr. with subj. 'servus.' This verb governs acc. and dat.
Portas	acc., plur., fem., noun of 1st decl., porta-ae, gov. by 'clauserant.'

OPTIONAL.

Translate into Latin:—

(*a*) He was a man of the greatest wisdom.
(*b*) We have loved the songs of the poet.

(*a*) Ille fuit vir summâ prudentiâ, or summae prudentiae.
(*b*) Nos poetae carmina amavimus.

(*To be continued.*)

Pupil Teachers' Preparation Papers.

MOST of our readers will be acquainted with the fact that various Inspectors of Schools as well as the authorities of Training Colleges complain of the bad way in which pupil teachers are prepared both for their own Examinations and the Queen's Scholarship test. This want of preparedness is not always the fault either of the teacher or his pupil. But the loss falls with greatest force on the pupil who loses the yearly grant of 40s. or 60s., and perhaps a good position on the Scholarship list, from circumstances beyond his control. Masters and mistresses of country schools often find but little time to carefully prepare a syllabus for their young assistants, and for want of time and the needful help the evil results already mentioned follow.

We wish still further to make the PRACTICAL TEACHER worthy of its name, and if possible of greater use still to both teachers and pupil teachers. To this end we intend to devote a portion of our space monthly to their interests. Two experienced practical teachers will write short papers, and model essays, set specimen papers, and give model answers to the Government questions. Pupil teachers are now examined twice a year, and something of value for each set will be found in each number of the PRACTICAL TEACHER. We shall relieve the work of the masters and mistresses by setting examination papers to cover the work of each quarter, giving also a test examination paper previous to the yearly examinations in April and October. That a pupil teacher may know in what subject he is weak, we undertake to examine these papers at the nominal rate of one shilling per set, and return them with notes direct to anyone sending them to us. Any candidate at the examination may thus know, before the time, to what subjects he must particularly direct his attention if he wishes to successfully pass the yearly test. By this means we hope large numbers may be enabled to earn the grant to pupil teachers who are now marked as failures, or who only just 'scrape through.' Masters and mistresses who have charge of schools will thus be relieved of much anxiety in the preparation of quarterly tests, while the assessment of our examiners, who have each had upwards of twenty years' experience in examining and setting papers, and who are among the best known and most highly respected teachers in the kingdom, may be taken as a sure guide to H. M. Inspector's assessment.

The papers for the Fourth Year pupil teachers will be of such a character as to include preparation for the Scholarship examination. The whole ground before entering college will thus be covered, and other parts of the magazine will carry the teacher through to his certificate, and aid him in his everyday work in the school.

The present number contains a Test Paper for the April teachers.

If answers to any year of this set be forwarded to us by the 10th of this month, with a postal order for one shilling enclosed, they shall be returned corrected and post free by the end of the month. Four weeks will then be left for perfecting good work, and for making up places where the pupil teacher is weak.

The April number will contain a half-yearly test for the October teachers, and a paper of hints, instructions, and other valuable aid to the April teachers.

TEST PAPERS FOR PUPIL TEACHERS WHO ARE TO BE EXAMINED IN APRIL.

Directions.

1. Write on half sheets of foolscap, and on one side only.
2. At the top of each half sheet write you name in full; also the full name of your school, and the year whose papers you are answering.
3. Do not write the questions, but prefix to each answer the number of the question to which it corresponds.
4. Do not use any book or writing from which answers may be copied.
5. If you have not time to answer all the questions in any subject, choose those you can answer the best; but do not omit the whole of any one subject.
6. Keep strictly to the time allowed.

END OF FIRST YEAR.

Three and a half hours allowed.

Arithmetic.

(*Do three sums only.*)

MALES.

1. (*a*) What is meant by a decimal fraction; a recurring decimal. Give other names for a recurring decimal.

(*b*) Find the value of $13\frac{33}{480}$ of 2 cwt. 2 qrs., and of $\frac{33}{35}$ of £8 8s. $5\frac{1}{2}$d.

2. Add together $3\frac{2}{15}$, $2\frac{5}{12}$, $\frac{1}{6}$ and $\frac{4}{45}$; also find the difference of $3\frac{4}{27}$ and $2\frac{5}{9}$ and divide $3\frac{4}{27}$ by $2\frac{5}{9}$.

3. Divide 24·109932 by 301·28, and find the value in cubic feet and inches of ·90625 of a cubic yard.

4. A gives away in charity $\frac{1}{8}$ of his income and pays $\frac{1}{16}$ of it in rates and taxes. After these deductions he has £473 13s. 1d. left. What is his gross income?

FEMALES.

1. Find by practice the rent of 134 ac. 3 rds. 16 pls. at £2 12s. 6d. per acre.

2. Make out a bill for 17 yards of calico at $9\frac{3}{4}$d. per yard; $34\frac{1}{4}$ yds. of flannel at 1s. 9d. per yd.; $25\frac{1}{2}$ yds. of linen at 2s. $7\frac{1}{2}$d. per yd.; 14 pairs of stockings at 2s. $4\frac{1}{2}$d. per pair; and 5 pairs of gloves at 19s. 3d. per dozen pairs. Receipt it.

3. What do you understand by the Greatest Common Measure? Find the G. C. M. of 125, 690, 935.

4. Explain the rule for addition of fractions. What fraction would be left after paying away $\frac{2}{3}$ of my money and then $\frac{4}{5}$ of the remainder?

Geography.

MALES AND FEMALES.

(*Answer three questions only.*)

1. Draw a map of Wales and insert Snowdon, Bala, Flint, Swansea, Cardiff, the rivers, capes and openings.

2. Name the various parts of the Dominion of Canada, their chief towns, and where situated. Give the productions of Manitoba and the North-West Territory.

3. Which are the chief manufacturing towns of Lancashire and Scotland? Say for what each is noted.

4. If you had to travel to Melbourne in the shortest time possible, which route would you take, and what places would you pass through? State briefly any other way of reaching the same place.

Grammar.

MALES AND FEMALES.

(*Answer Questions 1 and 2, and one other question.*)

1. But see! the *minstrel* vision fails,
   The glimmering spears are seen *no more;*
The shouts of war die on the gales,
   Or sink in Evan's lonely roar.
For the loud bugle *pealing* high,
   The blackbird whistles down the vale,
And *sunk* in ivied ruins *lie*
   The bannered *towers* of Evandale. *Scott.*

Analyse the lines 1, 2, 5—8.

2. Parse the words in italics.

3. Give six examples of terminations of English nouns and six adjectives, explaining their use and meaning.

4. What are mood, voice, tense and person as applied to verbs. Give examples.

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. What claim had William of Normandy to the British throne? Who was the last Saxon king? Give a short account of his reign?

2. When was Christianity introduced into England? Which part was first subject to its influence?

3. Name the chief events of Alfred's reign. What progress did England make while he was king?

4. Who was Tostig? Guthrum? Sweyn? Adrian? Julius Cæsar?

END OF SECOND YEAR.

FIRST PAPER.

Euclid.

MALES.

(*Answer two questions, including Question 3, if you can.*)

1. The angles at the base of an isosceles triangle are equal.

2. To draw a straight line at right angles to a given straight line from a given point in the same.

3. If A be the vertex of an isosceles triangle ABC, and BA be produced so that AD is equal to BA, show that BCD is a right angle.

Arithmetic.

MALES.

(*Do three sums only.*)

1. How long has a bill to run if the discount on £929 10s. calculated at $2\frac{1}{2}$ per cent., is £49 10s.?

2. What is meant by *stocks?* consols? brokerage?

Find the income derived from investing £1050 in the $2\frac{3}{4}$ per cents. at $85\frac{1}{8}$, a brokerage of $\frac{1}{8}$ per cent. being charged.

3. What is the difference between the simple and compound interest on £650 for 2 years, interest payable half-yearly at 5 per cent.?

4. A block of marble at the rate of 32s. a cubic foot cost £130. It was $6\frac{1}{2}$ feet long and $3\frac{3}{4}$ feet wide. What would it have cost had its thickness been $2\frac{1}{4}$ feet?

FEMALES.

1. What is meant by a decimal fraction? a recurring decimal? Give other names for a recurring decimal. Find the value of $13\frac{53}{480}$ of 2 cwt. 2 qrs.

2. Convert the following vulgar fractions into decimal fractions:—$\frac{4}{175}$, [illegible], [illegible], $\frac{11}{12}$.

3. What is the value of $\frac{3}{4}$ of $\frac{1}{9\frac{1}{3}}$ of £1 18s. + $\frac{2}{3}$ of $\frac{3}{8}$ of 15s. + $\frac{2}{5}$ of [illegible] of 8s. 3d.

4. What fraction divided by $2\frac{1}{4}$ is greater by $\frac{2}{3}$ than three times $4\frac{1}{7\frac{1}{3}}$?

Grammar.

(*Answer Questions* 1 *and* 2, *and one other question.*)

Each hath his refuge whom thy cares assail.
For me, I love my study fire to trim,
And con right vacantly some idle tale,
Displaying on the couch each listless limb,
Till on the drowsy page the lights grow dim,
And doubtful slumber half supplies the theme;
While antique shapes of knight and giant grim,
Damsel and dwarf in long procession gleam,
And the Romancer's tale becomes the Reader's dream.

Scott.

(NOTE:—*Thy* in line 1 stands for *Ennui.*)

1. Put the above passage into simple prose.
2. Analyse the first six lines.
3. Write out the various kinds of enlargements of the subject with examples.
4. What Latin prefixes signify to, under, in the way of, against, out of, before. Give examples of words in which they are used. What is the signification of the following terminations; -ous, -tion, -ment, -al, -ible.

Geography.

MALES AND FEMALES.

(*Answer three questions only.*)

1. Draw a map of India with parallels and meridians, marking the chief cities, rivers, and mountains.
2. What are the chief vegetable and mineral productions of Southern Europe? Give the chief ports and the articles of export shipped from each.
3. Describe the physical features of France or Switzerland.
4. How would you explain to a class the variation of time between New York, Dublin, and London?

SECOND PAPER.

(*Two and a half hours allowed.*)

History.

1. Give an account of the Spanish Armada.
2. In whose reigns were the following battles fought, and what was the cause and the result of each? Neville's Cross, Agincourt, Crecy, Poictiers, Sluys.
3. What was Magna Charta? How can it be said that it is the foundation of personal liberty?
4. Give a short account of the social condition of England at the close of the Tudor dynasty.

Teaching.

(*Answer two questions only.*)

1. How would you give a dictation lesson? What benefits do you expect the children to derive from such a lesson?
2. Give a list of some of the common faults you have observed in the reading lessons of your class during the past year.
3. How do you correct a bad style of writing? State what you think constitutes a good style?
4. Describe some of the apparatus used for teaching number to the youngest children in the infant school.

END OF THIRD YEAR.

FIRST PAPER.

(*Three and a half hours allowed.*)

Euclid.

MALES ONLY.

(*Answer two questions, including No. 3, if you can.*)

1. The complements of the parallelograms which are about the diagonal of any parallelogram are equal to one another.

2. To describe a square on a given finite straight line.

3. If a quadrilateral is bisected by one diagonal, the second diagonal is bisected by the first.

Algebra.

MALES ONLY.

(*Answer two questions, including question 3, if you can.*)

1. (*a*) Divide $x^3 - (a + 2)x^2 + (2a + b)x - 2b$ by $x - 2$.
(*b*) Divide $57a^5bc^2$ by $3a^6b^2c^4$.

2. Find the algebraic sum of

$$\frac{5}{6} + \frac{3b-1}{24} - \frac{3b-5}{24}$$

3. Solve the equation

$$\frac{1}{2}\left(1 - \frac{16x}{2x-3}\right) = \frac{14x + 5}{8-6x}$$

A fruit dealer had some peaches, one half of which he bought at 5 for 1s., and the rest at 6 for 1s. He sold them at 11 for 2s., and lost 1s. 6d. How should he have sold them to gain a guinea on the transaction?

Mensuration.

MALES ONLY.

(*Answer one question only.*)

1. Find the area of a triangular piece of ground whose sides are 68, 91, and 54 yards respectively.

2. How wide is a street if a ladder 60 ft. long placed towards its middle will reach the tops of the houses on opposite sides, the heights of which are 40 and 52 feet respectively?

FEMALES ONLY.

(*Answer three questions only.*)

1. Convert $\cdot 42857\dot{1}$ into a vulgar fraction in its lowest terms, and divide $\cdot 1\dot{6}$ by $\cdot 01\dot{6}$.

2. After running out of a cistern ¼ of its contents, and then one-third of the remainder, and again ⅙ of what was then left, what decimal of the whole remained? If that fraction represented 270 gallons, what did the whole cistern contain?

3. A bankrupt whose effects are worth £128 15s. 6d. pays 1s. 8d. in the £. What are his debts?

4. Find the value of $\cdot\dot{2}8571\dot{4}$ of £30 + £$6\cdot\dot{8}5714\dot{2}$ + $\cdot\dot{6}$ of $\cdot\dot{7}1428\dot{5}$ of £6 + £514 8s. 6¾ + $1\cdot\dot{3}$ of $\cdot\dot{4}2857\dot{1}$s.

Grammar.

(*Answer questions 1 and 2, and one other question.*)

MALES AND FEMALES.

1. *Yet* here, Laertes! aboard, *aboard*, for shame!
The wind *sits* in the shoulder of your sail,
And *you are stayed for*. There, my *blessing* with thee!
And these few precepts in thy memory
See thou *character*. Give thy thoughts no tongue,
Nor any unproportioned thought his *act*.
Be thou familiar, but by no means vulgar.
Those friends thou hast, and their adoption *tried*,
Grapple them to thy soul with hoops of steel.

Shakespeare.

Paraphrase the above passage.

2. Analyse from 'yet' to 'character.' Parse the words in italics.

3. What kinds of subordinate sentences are there? Give examples. Define *a complex sentence*, *a finite verb*, *an interrogative pronoun*.

4. Write out a dozen terminations of Latin words, and give three examples of words in which each is used.

Geography.

MALES AND FEMALES.

(*Answer question 1 and two other questions only.*)

1. Draw a map of China *or* of South Africa.

2. Name the principal vegetable productions of India under the headings of *food products* and *raw materials used in manufactures*.

3. What are monsoons? Where are they found? What phenomena frequently attend the changes of monsoons? Give a full answer.

4. Where and what are Niger, Baikal, Kurachee, Cutch, Benin, Nankin, Tokio, Seychelle, Hooghly, Tobolsk.

SECOND PAPER.

(*Two hours and a half allowed.*)

(Needlework for Females. *One hour.*)

Arithmetic.

(*Answer three questions only.*)

MALES ONLY.

1. How much money must I invest in the 4½ per cents. at 102 in order to have an income of £365 2s. 6d. after paying an income tax of 7d. in the £.

2. What is the square root of ⅜ to six decimal places?

3. Find the true discount on a bill for £1678 8s. 4d. drawn March 6th at 7 months, and discounted Sep. 15 at 5 per cent.

4. Give the rule for extracting the square root. Explain and prove the method of pointing in division of decimals. Divide ·02552904 by ·0054.

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. Explain the circumstances which led to the execution of Charles I.

2. Enumerate the chief political events of the reign of George III.

3. Give the dates of—(*a*) The first Reform Bill; (*b*) Negro Emancipation; (*c*) Declaration of Independence; (*d*) Habeas Corpus Act; (*e*) Petition of Right; (*f*) Battle of Trafalgar. Write what you know of any one of them.

4. Who were the principal statesmen and writers in the times of the Stuarts? Write a life of Strafford.

Teaching.

MALES AND FEMALES.

(*Answer two questions only.*)

For Teachers in Schools for Older Scholars.

1. Write notes for a lesson on—(*a*) *The divisions of England*; (*b*) *The manufacturing towns of England, or* (*c*) *A river.*

2. What difficulties have you met with in teaching children to distinguish adjectives and adverbs.

3. What apparatus do you use in teaching the Geography of Standard II.

For Teachers in Infant Schools.

1. Give a list of six suitable object lessons for infants, and say what end would be served by giving such lessons.

2. Name some of the varied occupations in use in your school. What is musical drill?

3. Write notes of a lesson on 'A teacup' or 'A table.'

END OF FOURTH YEAR.

Euclid.

MALES ONLY.

(*Three and a half hours allowed.*)

1. If a straight line be divided into any two parts, the square on the whole line is equal to the squares on the two parts together with twice the rectangle contained by the parts. State this proposition algebraically.

2. To describe a square that shall be equal to a given rectilineal figure.

3. From Euclid II. 4, deduce a proof of Euclid I. 47.

Algebra.

(*Answer two questions, including question 2, if you can.*)

1. Solve the equations:—

(*a*) $\frac{x}{a}+\frac{y}{b}=a+b.$

$\frac{a}{x}+\frac{b}{y}=\frac{1}{a}+\frac{1}{b}.$

(*b*) $\left.\begin{array}{r} x-3y=3 \\ 2x+y=-29 \end{array}\right\}$

2. Show how to find the L. C. M. of three quantities. Prove the truth of your method.

Find the L. C. M. of $2x^3-2x^2+2x-1$, x^3-2x^2+2x-1, $2x^3-x^2-2x+1$.

3. Resolve into factors:—

(*a*) $9x^2-97x-22$

(*b*) $10x^2-7ax-12a^2$

Find the three roots of $8a^3-27=0$.

Mensuration.

(*Answer one question.*)

1. What relationship exists between the circumference of a circle and its diameter? Also between a circle and a circumscribed square? State the rule for finding the area of a sector of a circle.

2. A ladder 12 ft. long is gradually raised against a wall, its ends being in contact with the wall and the ground. Find the radius of the circle described by its middle point as it is being raised.

Arithmetic.

FEMALES ONLY.

1. A man invested a sum of money in the Four-and-a-Half per Cents. at 94, and received a half-year's dividend upon it. He then sold out at 96¼, and the whole increase of capital he had was £270. How much did he invest?

2. A man engages in business with £800 capital. At the end of six months he takes another into partnership with £1,050, and at the end of three months more a third, with a capital of £450. At the year's end they had made £640 profit. What share should each receive?

3. A father left ½ – £140 of his money to his eldest son, ¼ + £20 to his second son, ⅓ – £220 to his youngest son, and ⅕ to his wife. Find the eldest son's share.

4. The 3 per cent. stock is at 98⅜, and the 3½ per cent. at 106½. Into which is it most advantageous to buy?

Grammar.

MALES AND FEMALES.

1. *No more* the smith his dusky brow *shall clear*,
Relax his ponderous strength, and *lean* to *hear*;
The host *himself*, *no longer* shall be found
Careful to see the mantling bliss *go round*;
Nor the coy maid, *half* willing to *be prest*,
Shall kiss the cup to pass it to the *rest*.
Goldsmith.

Analyse the above passage, and parse the words in italics.

2. Give some English words derived from *do*, I give; *fero*, I bear; *gradus*, a step; *ludo*, I play; *lavo*, I wash.

3. Give specimens of the words introduced into English from foreign countries.

Geography.

(*Answer three questions only.*)

1. Draw a map of the Atlantic Ocean, Canada, Australia, or China.

2. Write a full account of the causes of the tides. Illustrate your answer by diagrams.

3. How are the seasons caused?

4. Name the most important countries in each of the four continents, with their capitals and other important towns.

SECOND PAPER.

(*Two and a half hours allowed.*)

(Needlework for Females. *One hour.*)

Arithmetic.

MALES ONLY.

(*Answer three questions only.*)

1. Find the value of a piece of land 110 yards long and ¾ of a mile wide at £6 10s. per acre.

2. To the simple interest on £6470 4s. 11·52d. for 5 years at 2 per cent. add the compound interest on £650 for 2½ years at 6 per cent.

3. Coffees costing 10d., 1s., and 1s. 2d. per lb. are mixed and sold at 1s. 8d. per lb. What is the gain per cent. and the gain also on 1¼ cwt. of the mixture?

4. What ready money will discharge a debt of £528 9s., due half year hence, at 4⅞ per cent?

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. What were the causes which led to the Seven Years' War? Who were the principal actors in it?

2. How does a person become a Member of Parliament? What privileges has he? Of how many members does the House of Commons consist?

3. What were the relations of England and India from 1497 to 1708?

4. Give an account of the rise and fall of the French power in America.

Teaching.

(*Answer two Questions only.*)

1. Write notes of a lesson on (*a*) The Verb, (*b*) Practice, (*c*) China.

2. What are the most common faults you have to correct during a writing lesson?

3. How do you give a dictation lesson? What advantages has dictation over transcription?

For Teachers in Infant Schools.

1. Write a specimen copy for the upper class in an Infant School. Show by specimens some of the mistakes which would probably be made in the formation of the letters.

2. Write notes of a lesson on 'A Needle,' or 'A Walk through the Streets.'

3. What method have you adopted in teaching *Reading* to young children? What other methods have you been made acquainted with?

(*To be continued.*)

Query Column.

RULES.

1. Each correspondent is restricted to *one question.* We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly,* and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month,* or they cannot be attended to in the following issue.

⁂ All communications for this column should be addressed—'*The Query Editor,*' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.*

General.

1. MATRICULATION.—You should have said whether you intend to take a degree in Arts or Science. If you only want to Matriculate you need only study Latin, English and French or German. But as you would have to take Greek in the Intermediate B.A., if you intend to go in for it you might as well begin Greek at once. If you intend to take a degree in Science you should learn German. Write *for a Syllabus* to the Registrar of the London University, Burlington House, Piccadilly, W.

2. INQUIRER.—You may omit the following chapters; 27 to the end of the book.

3. Z.—(1) No they are not. They are however such as any one is supposed to be able to answer who has a good knowledge of the grammar. Be sure you work plenty of exercises, and have them properly corrected. Great value is attached to a correct rendering of the passages set. (2) If Cæsar, Book VII. is set, that and that only is the author you need to make a special preparation of. Why do you mention all the rest. If you mean that having read them you would be prepared for the unseen passages we should reply that we could not say, because we do not know how much help you needed and obtained in reading them. It would be best to take some small manual of unseen passages and attempt a few each week under similar conditions to those imposed in the actual examination.

4. PRACTICAL TEACHER.—Your list is excellent. Get your exercises well corrected. Messrs. Longmans' have just issued 'Comus' with Notes, 1s. You can also read the answers to the other queries of this month.

5. E. C. H.—It is difficult to say. Watt's 'Chemistry,' published by Churchill, is a good book. We get apparatus and chemicals from Becker & Co., 34, Maiden Lane, W.C. Twisden's 'Theoretical Mechanics.'

6. Y. N. Q.—If you have withdrawn already you may consider that you will not be looked upon as having really entered at all; that is your position will be that of an acting teacher and therefore all the regulations relating to acting teachers will apply to you. This really disposes of all your queries.

7. W. C. BENNETT.—(*b*).

8. L. D. W.—You will find your queries answered in the answers previously given. Add Sully's 'Handbook of Psychology' to your list and Jevons' 'Primer on Logic.'

9. MAGISTER.—We hope to give full solution to your query in our next issue, the diagrams have caused delay.

10. JULIUS.—The syllabus is explicit, It says that 'acting teachers who have not passed with credit in the preceding year in either (or both) of groups (*c*) (*d*), must take it (or them) up again. Acting teachers who have not been examined in the preceding year must take up both groups (*c*) (*d*). Acting teachers who have not passed with credit in Arithmetic in the preceding year must answer the questions on arithmetic instead of those on mensuration.' This quotation may save questions in future.

11. PRECEPTOR.—You should send us the syllabus or the questions last set, or state how much you know of the subjects already. Lock's 'Trigonometry,' C. Smith's 'Conic Sections,' Roscoe's 'Inorganic Chemistry,' Huxley's 'Animal Physiology,' Ganot's or Deschanel's 'Natural Philosophy,' are all good books.

12. A. J. K.—We have asked the opinion of a gentleman who has been employed upon the *Times* for many years, and another who reports in the House for the *Standard.* Both advise the system you name. There is no better. Having adopted it do not change it in the least. Uniformity in this subject is all important.

13. GAUDIUM.—Use Lock's 'Dynamics for Beginners' and the 'Statics' as soon as it is out; S. Thompson's 'Electricity and Magnetism'; Wright's 'Sound, Light and Heat.'

14. IMPROVER.—The large hand is not good. The second attempt is far the best. Don't bear so heavily upon your pen; try to make easy and even curves, and take special pains to write each letter perfectly. 70. The small hand is much better. The letter *f* is done in two ways, neither of them correct. The last word is good, but it contains no letters presenting any difficulties. 78.

15. WOLVERHAMPTON.—Read papers on 'Pestalozzi' in this journal. The essays are published by the Clarendon Press. Use Macarthy's 'History of Our Own Times,' and also 'The Victorian Period' by Mackenzie. The literature of Victoria's reign is dealt with in a small volume by Prof. Morley. Have you got Capel's 'Catch Questions in Arithmetic'? Try it. Also read all the articles on Physical Geography in the Notes of Lessons now appearing in this journal.

16. CONSTANT SUPPORTER.—We are quite unable to tell you of cheap editions of the books you name. Most likely your choice will be exceedingly limited. But you would probably save considerably by writing to some of the second-hand booksellers and asking for exactly what you want: Try Reeves and Turner, Strand; or Walford Bros., Strand. A translation of Ortolan's L'histôire de la legislation Romaine, and Generalisation du droit Romain, by Pritchard and Nasmith, is published by Butterworth, 7, Fleet Street. For constitutional history read Erskine May, Hallam, and Stubbs.

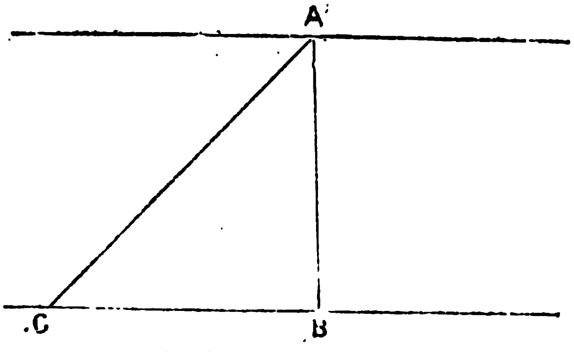
17. A. H. M.—The Clarendon Press Edition will meet your requirements. You should name the examination you are preparing for. Domestic Economy is not one of the subjects, do you mean Political Economy, if so you can use Jevons' Shilling Manual and Mrs. Fawcett's Lessons, both published by Macmillan and Co. You might also read Marshall's 'Economics of Industry' with advantage. The other subject is now very wide indeed. You should have read Sully's 'Psychology,' Jevons' 'Logic,' in addition to books like Langton's or Gladman's 'School Management.' Read also the articles on 'Pestalozzi,' now appearing in this journal.

18. EXCISE.—I am walking along the straight bank of a river, and should like to know its width. I am told it can easily be ascertained with the aid merely of a watch, provided I know the length of my pace; this is two and a half feet. How am I to find the width of the river?

Take note of an object on the edge of the opposite side of the river. Then take a position exactly opposite; this can be done by noticing the position of the minute hand; *e.g.*, if it be at the quarter, let it point at the object, and see that the bank on which you are standing is on a line with the line that would be drawn through XII. and VI.; if at 25 minutes past, on a line with the line through II. and VIII.

Then walk along the bank for $7\frac{1}{2}$ minutes, still seeing that the line through the same two figures corresponds with the bank.

Walk back to the starting point counting the paces, which multiplied by $2\frac{1}{2}$ will give the width in feet.



Proof.—Let A be the object, and B the position exactly opposite; also let C be the position after $7\frac{1}{2}$ minutes. Then the angle ACB will be half a right angle, as the minute hand passes over a right angle in 15 minutes.

Therefore angle BAC is half a right angle (I. 32.), and BA is equal to BC. (I. 6.)

Wherefore width of river is equal to the distance BC.

19. PENDEW.—Show that the equation $(3x + z)(2x - 3z + 8) = 4$ represents a locus which lies entirely in two of the angles formed by the lines $(3x + z = 0)$ and $(2x - 3z + 8 = 0)$.

(*Puckle's* 'Conics.')

The point of intersection of the lines is found by equating $3x + z = 0$ and $2x - 3z + 8 = 0$.

$$\left.\begin{aligned}(1)\ 3x + z &= 0\\ (2)\ 2x - 3z &= -8\end{aligned}\right\}$$

$$\left.\begin{aligned}(1)\ 9x + 3z &= 0\\ (2)\ \underline{2x - 3z} &= \underline{-8}\end{aligned}\right\}$$

$$11x \qquad = -8$$

$$\therefore\ x = -\tfrac{8}{11}.$$

$$(1)\ z = -3x = \tfrac{24}{11}.$$

$$(3x + z)(2x - 3z + 8) = 4$$

$$6x^2 - 7xz - 3z^2 + 24x + 8z - 4 = 0$$

Transfer the origin of co-ordinates to the point of intersection of the two lines by putting

$$x = x' - \tfrac{8}{11}, \text{ and } z = z' + \tfrac{24}{11};$$

$$\begin{aligned}\therefore\ 6\left(x' - \tfrac{8}{11}\right)^2 &- 7\left(x' - \tfrac{8}{11}\right)\left(z' + \tfrac{24}{11}\right)\\ &- 3\left(z' + \tfrac{24}{11}\right)^2 + 24\left(x' - \tfrac{8}{11}\right)\\ &+ 8\left(z' + \tfrac{24}{11}\right) - 4 = 0\end{aligned}$$

$$\begin{aligned}6\left(x'^2 - \tfrac{16}{11}x' + \tfrac{64}{121}\right) &- 7\left(x'z' + \tfrac{24}{11}x' - \tfrac{8}{11}z' - \tfrac{192}{121}\right)\\ &- 3\left(z'^2 + \tfrac{48}{11}z' + \tfrac{576}{121}\right) + 24x' - \tfrac{192}{11}\\ &+ 8z' + \tfrac{192}{11} - 4 = 0\end{aligned}$$

$$\begin{aligned}6x'^2 - \tfrac{96}{11}x' + \tfrac{384}{121} &- 7x'z' - \tfrac{168}{11}x' + \tfrac{56}{11}z'\\ &+ \tfrac{1344}{121} - 3z'^2 - \tfrac{144}{11}z' - \tfrac{1728}{121}\\ &+ 24x' + 8z' - 4 = 0\end{aligned}$$

$$6x'^2 - 7x'z' - 3z'^2 - 4 = 0;$$

We can suppress the accents and write the equation

$$6x^2 - 7xz - 3z^2 - 4 = 0.$$

This equation can be further simplified by changing the direction of the axes.

$$\left.\begin{aligned}\text{Put } x &= x'\cos\theta - z'\sin\theta\\ z &= x'\sin\theta + z'\cos\theta\end{aligned}\right\}$$

and substitute :—

$$\begin{aligned}\text{Then, } 6\,(x'^2\cos^2\theta &- 2x'z'\sin\theta\cos\theta + z'^2\sin^2\theta)\\ &- 7\,(x'^2\sin\theta\cos\theta - x'z'\sin^2\theta + x'z'\cos^2\theta\\ &- z'^2\sin\theta\cos\theta) - 3\,(x'^2\sin^2\theta + 2x'z'\sin\theta\cos\theta\\ &+ z'^2\cos^2\theta) - 4 = 0\end{aligned}$$

$$\begin{aligned}x'^2\,(6\cos^2\theta &- 7\sin\theta\cos\theta - 3\sin^2\theta)\\ &- x'z'\,(18\sin\theta\cos\theta - 7\sin^2\theta + 7\cos^2\theta)\\ &- z'^2\,(3\cos^2\theta - 7\sin\theta\cos\theta - 6\sin^2\theta) - 4 = 0;\end{aligned}$$

Equating the co-efficient of $x'z'$ to zero;

$$\begin{aligned}\text{Thus, } 18\sin\theta\cos\theta + 7\,(\cos^2\theta - \sin^2\theta) &= 0\\ 9\sin 2\theta + 7\cos 2\theta &= 0\\ 9\sin 2\theta &= -7\cos 2\theta\\ \frac{\sin 2\theta}{\cos 2\theta} &= -\tfrac{7}{9}\\ \therefore\ \tan 2\theta &= -\tfrac{7}{9}.\end{aligned}$$

Since θ can always be found to satisfy this, the term involving $x'z'$ can be removed, and the equation becomes

$$\begin{aligned}x'^2\,(6\cos^2\theta &- 7\sin\theta\cos\theta - 3\sin^2\theta)\\ &- z'^2\,(3\cos^2\theta - 7\sin\theta\cos\theta - 6\sin^2\theta) - 4 = 0,\end{aligned}$$

Or, $Ax'^2 - Bz'^2 - 4 = 0$, putting A and B for co-efficients of x'^2 and z'^2;

Therefore the locus represents an Hyperbola, the centre of which is the intersection of the two lines $3x + z = 0$, and $2x - 3z + 8 = 0$, and it therefore lies entirely in two of the angles formed by the two lines.

20. ROWENA.—We cannot print long extracts from a history. Read either Dr. Smith's 'Smaller History of England,' or better still, Green's 'Short History of the English People,' and make notes as you go over the period referred to. Then you should condense the materials till the answer occupies about one side or three-quarters of a page of foolscap paper.

21. CYCLOPS.—Find x and θ from the equations

$$x^2 = a^2 + b^2 - 2ab \cos \theta,$$
$$x^2\sqrt{3} = 2ab \sin \theta.$$

(*Science and Art*, 1885.)

$$\left.\begin{array}{ll}(1) & x^2 = a^2 + b^2 - 2ab\cos\theta \\ (2) & x^2\sqrt{3} = 2ab\sin\theta\end{array}\right\}$$

$$\left.\begin{array}{ll}(1) & x^2 - (a^2 + b^2) = -2ab\cos\theta \\ (2) & x^2\sqrt{3} = 2ab\sin\theta\end{array}\right\}$$

$$\left.\begin{array}{ll}(1) & x^4 - 2x^2(a^2 + b^2) + (a^2 + b)^2 = 4a^2b^2\cos^2\theta \\ (2) & 3x^4 = 4a^2b^2\sin^2\theta\end{array}\right\}$$

$$\text{Adding]}\ 4x^4 - 2x^2(a^2 + b^2) + (a^2 + b^2)^2 = 4a^2b^2(\sin^2\theta + \cos^2\theta)$$
$$= 4a^2b^2$$

$$4x^4 - 2x^2(a^2 + b^2) = 4a^2b^2 - (a^2 + b^2)^2$$
$$= 4a^2b^2 - a^4 - 2a^2b^2 - b^4$$
$$= 2a^2b^2 - a^4 - b^4$$

$$x^4 - \frac{x^2(a^2 + b^2)}{2} = \frac{2a^2b^2 - a^4 - b^4}{4}$$

$$x^4 - \frac{x^2(a^2 + b^2)}{2} + \left(\frac{a^2 + b^2}{4}\right)^2$$
$$= \frac{a^4 + 2a^2b^2 + b^4 + 8a^2b^2 - 4a^4 - 4b^4}{16}$$
$$= \frac{10a^2b^2 - 3a^4 - 3b^4}{16}$$

$$x^2 - \frac{a^2 + b^2}{4} = \frac{\pm\sqrt{10a^2b^2 - 3a^4 - 3b^4}}{4}$$

$$x^2 = \tfrac{1}{4}(a^2 + b^2 \pm \sqrt{10a^2b^2 - 3a^4 - 3b^4})$$

$$\therefore x = \pm\tfrac{1}{2}\sqrt{(a^2 + b^2 \pm \sqrt{10a^2b^2 - 3a^4 - 3b^4})}.$$

$$(2)\quad x^2\sqrt{3} = 2ab\sin\theta$$

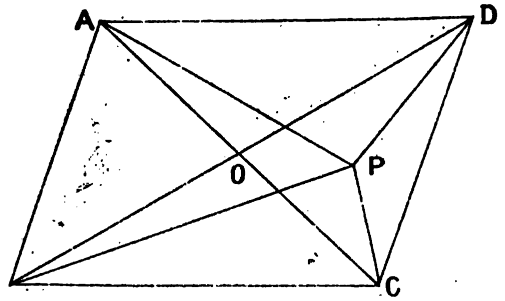
$$\frac{\sqrt{3}}{4}(a^2 + b^2 \pm \sqrt{10a^2b^2 - 3a^4 - 3b^4}) = 2ab\sin\theta$$

$$\therefore \text{Sin}\,\theta = \frac{\sqrt{3}(a^2 + b^2 \pm \sqrt{10a^2b^2 - 3a^4 - 3b^4}}{8ab}$$

$$\therefore \theta = \sin \quad \frac{\sqrt{3}(a^2 + b^2 \pm \sqrt{10a^2b^2 - 3a^4 - 3b^4}}{8ab}$$

Geometry.

1. TAN.—The diagonals AC, BD of a parallelogram intersect in O, and P is a point within the triangle AOB; prove that the difference of the triangles CPD, APD is equal to the sum of the triangles APC, BPD. (*Hamblin Smith.*)



Proof.—The diagonals of a parallelogram bisect it; (I. 34.)

∴ Each of the triangles ACD, BCD = ½ parallelogram ABCD.

△ ACD = △s APC, APD, CPD,

△ BCD = △s BPD, BPC, CPD;

But △s ACD, BCD = parallelogram ABCD;

∴ △s APC, APD, BPD, BPC, and twice CPD = parallelogram ABCD; (Ax. 1.)

Also △s APB, BPC, CPD, APD = parallelogram ABCD;

Wherefore △s APB, BPC, CPD, APD = △s APC, APD, BPD, BPC, and twice CPD (Ax. 1.)

Take from these equals △s BPC, CPD, APD,

∴ △ APB = △s APC, APD, CPD; (Ax. 3.)

Again, take from these equals △ CPD,

∴ Difference of triangles APB, CPD = Sum of triangles APC, APD.

Q. E. D.

Mensuration.

1. HODIE.—How many yards of brass wire, $\frac{1}{30}$ of an inch thick, will weigh half an ounce, reckoning the weight of a cubic foot of brass to be 8540 ounces?

$$\text{Area of section of wire} = (\tfrac{1}{30}\text{ in.})^2 \times {\cdot}7854$$
$$= \frac{{\cdot}7854}{900}\text{ sq. in.}$$
$$= \frac{{\cdot}002618}{3}\text{ sq. in.}$$

$$\text{Solidity of } \tfrac{1}{2}\text{ oz.} = \frac{1\text{ cub. ft.}}{8540 \times 2}$$
$$= \frac{\overset{\overset{216}{\cancel{864}}}{\cancel{1728}}}{\underset{2135}{\cancel{8540}} \times \cancel{2}}\text{ cub. in.}$$
$$= \frac{216}{2135}\text{ cub. in.}$$

$$\therefore \text{Length required} = \frac{216}{2135}\text{ cub. in.} \div \frac{{\cdot}002618}{3}\text{ sq. in.}$$
$$= \left(\frac{216}{2135} \times \frac{3}{{\cdot}002618}\right)\text{ in.}$$
$$= \frac{\overset{\overset{9}{\cancel{18}}}{\cancel{216}} \times \cancel{3} \times \overset{200000}{\cancel{1000000}}}{\underset{427}{\cancel{2135}} \times \underset{1309}{\cancel{2618}} \times \underset{\cancel{12}}{\cancel{36}}}\text{ yds.}$$
$$= \tfrac{1800000}{558943}\text{ yds.}$$
$$= 3\tfrac{123171}{558943}\text{ yds.}$$
$$\text{cr } 3\tfrac{1}{4}\text{ yds. nearly.}$$

2. DUNELM.—A sphere is surrounded by 6 balls, each of one-inch radius, in a plane through its centre, each touching two others and the sphere. Above these is a row of balls, each touching two of the others, two of the larger balls, and the sphere. What is the radius of the smaller balls?

As the sphere is just surrounded by the six balls, it is evidently the same size as the other balls.

The distance from the centre of one ball to the centre of another is 2 inches.

We therefore require the radius of the circle that can be described in an equilateral triangle of 2 inch sides.

Length of perpendicular in an equilateral triangle of side a

$$= \frac{a}{2}\sqrt{3};$$

And radius of inscribed circle

$$= \tfrac{1}{3}\text{ of }\frac{a}{2}\sqrt{3}$$
$$= \frac{a}{2\sqrt{3}};$$

$$\therefore \text{Radius of smaller balls} = \frac{2\text{ in.}}{2\sqrt{3}}$$
$$= \frac{1}{\sqrt{3}}\text{ in.}$$
$$\text{or } \tfrac{1}{3}\sqrt{3}.\ \text{Ans.}$$

Arithmetic.

1. H. M.—If 100 stones are placed on the ground in a straight line at the distance of a yard from each other, how far will a person travel who will bring them one by one to basket placed one yard from the first stone? (*Whitworth's* 'Arithmetic Test Papers, Standard VI.')

Distance in yards = sum of numbers from 2 to 200

= (sum of numbers from 1 to 100) × 2

= $(1 + 100) \times \frac{100}{2} \times 2$

= 10,100;

∴ Distance = 5 miles 1,300 yards. Ans.

2. FOLKESTONIAN.—A merchant sells tea to a shopkeeper at a profit of 60 per cent., but the shopkeeper becoming bankrupt pays only 2s. 6d. in the £. How much per cent. does the merchant lose by the sale?

Goods costing £100 are sold for £160, but only $\frac{1}{8}$ of £160 or £20 is received.

∴ Loss = (£100 − £20) on an outlay of £100
= 80 per cent. Ans.

3. NEMO.—The difference between the discount and the interest is $\frac{1}{30}$ of the sum of money discounted, and the rate is 4 per cent. Find the time. (*Capel's* 'Catch Questions in Arithmetic and Mensuration.')

This question cannot be worked by pure Arithmetic, since an unknown quantity is involved as a factor in a term.

At 4 per cent. for 1 year the difference is

$$\frac{4}{100} - \frac{4}{104}, \text{ or } 4 \times \frac{4}{100 \times 104} \text{ of principal;}$$

Similarly for 2 years the difference is $2 \times 4 \times \frac{2 \times 4}{100 \times 108}$ of principal; and therefore for t years the difference is

$$t \times 4 \times \frac{t \times 4}{100 \times (100 + t \times 4)} \text{ of principal;}$$

$$\therefore \frac{1}{30} \text{ of principal} = 4t \times \frac{4t}{100 \times (100 + 4t)} \text{ of principal,}$$

$$\frac{1}{30} = \frac{16t^2}{10000 + 400t},$$

$$\frac{1}{3} = \frac{16t^2}{1000 + 40t}.$$

$$= \frac{2t^2}{125 + 5t},$$

$$125 + 5t = 6t^2,$$

$$6t^2 - 5t = 125,$$

from which it can be ascertained that $t = 5$.

∴ Time = 5 years. Ans.

Note.—This is really a question in Algebra, and the time can be found from the quadratic equation:—$6x^2 - 5x = 125$. For $\frac{1}{480}$ in the question read $\frac{1}{30}$. The correction is given in the key.

Science Notes.

WE need not be surprised that the extraordinary rise in price of copper is leading to all sorts of devices for dispensing with it whenever that is possible. Prof. Silvanus Thompson has lately shown that iron may be substituted for copper in the case of lightning conductors, with advantage. It is preferable to use it in the form of a solid rod. Such rods do not easily fuse, they are not very subject to self-induction, and they are easily worked and cheap. The copper monopolists are not to have it all their own way.

⁂

A MARVELLOUS application of electricity has recently been made. It is seriously proposed to render sewage innocuous by passing a strong electric current through it. It is of course well known that to oxidise the objectionable matter is to render it harmless. Hitherto, this has been done indirectly by the use of bodies like permanganate of potash, or so-called chloride of lime. It is found, however, that if a strong electric current is passed through the liquid sewage, some of the water is decomposed by the current. The evolution of the gases agitates the liquid, and the nascent oxygen acts with the utmost power on the impurities contained in the sewage. The solid matter is thus rendered harmless to health and rapidly subsides. The separation of the solid matter in this safe and easy way makes it possible to remove it and restore it to the land—its proper destination. If the experiments now going on at Crossness should prove that sewage can be thus dealt with on a large scale at a moderate expense, one of the most important problems in sanitary science will have been solved. At present we are managing to pollute the rivers, impoverish the land, and to a certain extent poison the air of our cities. As the population of large towns increases, the questions of pure air and pure water will become more and more pressing.

⁂

DR. GATTERMANN has been investigating the nature of the chloride of nitrogen. He is pretty well satisfied that the yellow liquid is a mixture of at least two distinct chlorides, which he hopes to be able to separate. He finds that it is decomposed by the action of sunlight or burning magnesium. It may therefore be possible to avert some of the accidents which are liable to occur in dealing with this terribly explosive substance, by experimenting in a room where only the less refrangible rays are permitted to enter.

⁂

MR. A. C. MITCHELL has been engaged in repeating some of Forbes' experiments on the conductivities of metals, especially of iron, copper, and German silver. The bars were nickel-plated, in order to prevent oxidation, and also to enable him to estimate the amount of surface loss more accurately. His results agree in the main with those of Professor Tait and Principal Forbes. Mr. Mitchell has found that in iron conductivity increases with the temperature. Hitherto, iron has been regarded as exceptional in this respect, the general rule being that the conductivity for heat increases with the temperature.

⁂

THE rainfall in the British Isles was exceptionally low during the past year, the average was only 25·8 inches as against an average of 35·3 for the past 22 years. In the wheat producing districts the deficiency amounted to about 7·5 inches; while in the grazing districts the deficiency was 11·5 inches. 1887 was the driest year since 1886, the recorded rainfall being only about half that of 1872, which was a very wet year. The dry weather has continued since Christmas, until the recent snowstorms, which will have done a little toward moistening the earth. It seems only reasonable that a scarcity of water should be feared. The greatest care should be used to waste none. It is time that the sanitary authorities all over the country should rouse themselves to the danger to public health that would arise from a scarcity of water in the summer and autumn.

⁂

THOSE of our readers who are fond of natural history would be much interested in an article in *Nature* for February 16, on the Mechanism of the flight of Birds. The article and the illustrations are taken from *La Nature*, of December 3, 1887. The strides in photography have been so rapid and great that pictures can now be taken with a small fraction of a second. Most of the illustrations of birds in the act of flight are taken at the rate of ten per second. The paper is most interesting and instructive.

THE electric-lamp is now being used for fishing purposes. The glow lamp is encased in a net. It acts as a decoy. The fish are attracted by the light and swarm round it. When they are in the net it is closed and hauled in; a novel and attractive way of catching fish.

⁂

STUDENTS of biology ought to be happy and satisfied with the help and stimulus they receive in their work from the excellent books that are written for them. Huxley's book was the first, but it was soon followed by the practical handbooks of Foster. Then came the companion volumes of Scott and Vines. Many others have followed, notably Marshall and Parker. And now another biological text book is announced by Professor T. J. Parker, of New Zealand, the eldest son of W. K. Parker, F.R.S., who has done perhaps more original biological work than any living Englishman. Professor T. J. Parker was for many years Professor Huxley's demonstrator. There need be no doubt that his work will be on lines already familiar to those who have read the books we have named. Chemical students might well be not a little envious of the unity of purpose and aim which these writers display. At present there is no lack of text books on chemistry. But nobody writes a really excellent book, and what is perhaps worse, equally competent men are equally certain that there are no methods good for anything but their own.

Publications Received.

Blackie and Son—
Poynter's Drawing for the Standards, Nos. 13, 17, and 18.

Burns and Oates.—
Practical Geometry for Art Students. By John Carroll.

Cassell and Co., Limited—
The Citizen Reader.

Curwen, J., and Son—
School Cantata: The Shepherd's Garden. By T. Mer Pattison.

Heywood, John—
Ashman's Spelling Book.

Hodder and Stoughton—
Hazell's Annual Cyclopædia, 1888.
Teaching and Teachers. By H. Clay Trumbull, D.D.

Johnston, A.—
Johnston's Botanical Plates: Common Flax: Deadly Nightshade; Foxglove; Hazel; Meadow Buttercup; Maple; Opium Poppy; Red Lily; Thorn Apple.

Kegan, Paul, Trench and Co.—
Memory. By David Kay.

Longmans and Co.—
Elementary Physiography. By John Thornton, M.A.
Milton's Comus, with Notes. By A. M. Williams, M.A.

Murray, John—
Eton Exercises in Algebra. By E. Peake Rouse, M.A., and A. Cockshott, M.A.
Eton Exercises in Arithmetic. By the Rev. T. Dalton, M.A.

Nelson, T., and Sons—
The Royal Upper Class Readers. Great Authors, No. 2.

Nutt, David—
The French Idiomatic Pass-Key. By C. Stuart-Merritt.
A Companion to German Grammar and Composition. By D. Edwardes, M.A.

Oxford University Press—
Selections from the Books of Ezra and Nehemiah. By the Rev. H. M. Clifford, M.A.

Smith, Elder and Co.—
The Cornhill Magazine; February.

Swan Sonnenschein and Co.—
A Student's Manual of Psychology. By E. D. Drought.
Volapük. By Kirchhoff.

The Clarendon Press—
Milton's Paradise Lost. Book I. By the Rev. H. C. Beeching.
Primer of New Testament Greek. By the Rev. Edward Miller, M.A.
Practical Geometry for Schools. By Alfred Hughes.

The Educational Supply Association—
The Holborn Copy Books.

Whittaker and Co.—
The Public Examination French Reader. By A. M. Bower.
Practical Education. By C. G. Leland.
Electrical Instrument making for Amateurs. By S. R. Bottone.

Publications Reviewed.

Publications of Isaac Pitman and Sons, London:—

The Phonographic Teacher.

A Manual of Phonography. Jubilee Edition.

Pitman's Shorthand Copy Book.

Pickwick Papers. By Charles Dickens. In the easy reporting style of Phonography. Part I.

Representative British Orations. With Introductions by Charles Kendall Adams. Printed in an easy reporting style of Phonography. Vol. I.

The Phonetic Journal. Weekly.

Writing shorthand has in the past been commonly regarded as a special technical accomplishment for newspaper reporters. Of late years, however, its use has been largely extended. It is employed with great advantage in offices and places of commercial business, and those engaged in the learned professions of law and medicine have discovered its great utility in saving time. At a time when the need for technical instruction is exercising the minds of educational reformers it is well to consider the claims of the art of shorthand writing to a place in the course of preparation for commercial and professional pursuits. The Board for regulating the University Local Examinations has included shorthand in the requirements for the proposed Oxford and Cambridge Commercial Certificate; and the subject has been introduced into many of our public schools, both middle-class and elementary. Under the present conditions affecting public elementary schools, we are far from recommending the enforced addition of shorthand to the ordinary curriculum; but with a more elastic system of education, with greater freedom in the classification of scholars, and in the choice of subjects of instruction, shorthand would almost certainly be considered with favour by many educational authorities.

The books before us are all connected with the propaganda of what is, undoubtedly, the most popular system of shorthand. A system which has just celebrated its Jubilee, while its originator, Mr. Isaac Pitman, is still hale and active—which numbers its learners by the million, and is methodically taught in hundreds of schools and educational institutions, can need no special recommendation. We may, however, testify that Pitman's Phonography or Phonetic Shorthand is simple in character, based on scientific principles, and most thoroughly elaborated to adapt it to serve its purpose.

The 'Phonographic Teacher' is an excellent introductory text-book, with the lessons and exercises most carefully graduated. We notice by-the-bye a curious but obvious misprint on page 10, where the vowel places before and after the consonants are shown as alike in the two cases.

The 'Manual' is a more advanced text-book, carrying the student on to an easy reporting style. The 'Shorthand Copybook' affords practice in imitating copies carefully printed in phonography.

'The Pickwick Papers' is the first part of the work, which is to be completed in 24 parts. 'Representative British Orations' includes some of the best speeches of Sir John Eliot, John Pym, Lord Chatham, Lord Mansfield and Edmund Burke. Each of them is printed in easy reporting style, and is accompanied by a long-hand copy printed at the foot of each page. These two books afford excellent practice in reading shorthand, which is of course essential to any serviceable acquirement of the art.

The 'Journal' gives much useful and interesting information on the subject, and contains selections printed in various styles of phonetic shorthand and phonetic longhand.

Hazell's Annual Cyclopædia for 1888. London: Hodder and Stoughton.

We heartily congratulate the editor, printers and publishers on the third issue of this excellent annual. It is a veritable store-house of valuable information bearing on passing events. We wish we could see it on the shelves of every pupil teacher's library in the kingdom. When we add that the volume is sent forth in a handsome red cloth binding, contains over 600 pages, and is published at the ridiculously low figure of 3s. 6d., we feel further inclined to ask with the country yokel, 'How it's done.'

The Eton Mathematical Series: Exercises in Arithmetic. By Rev. T. Doeton, M.A.; **Exercises in Algebra.** By E. P. Rouse, M.A., and A. Cockshott, M.A. London: John Murray.

These handbooks of 'Exercises' should be widely used, as they embrace almost every conceivable kind of question that the ingenuity of an examiner could devise. To teachers who 'coach' students for the various public examinations they will be indispensable. The volumes have therefore our warmest commendation.

Practical Papers on Composition and Essay Writing. By George E. Skerry, F.R.S.L., and W. Cromb, M.A. London: Messrs. Simpkin, Marshall and Co.

Composition is an art in which proficiency can only be acquired by continued practice. Such papers as these, however, will be very helpful to the student. They are properly called practical, for they consist of introductory articles on Grammar, Syntax, Composition, and Style, followed by actual examples of essays written by successful candidates in the Civil Service competitions, numerous outlines of essays with valuable suggestions for filling them up and making them complete, abundant rules and cautions with exercises thereon, and a selection of nearly 200 subjects for essays which have been set in recent years by the Civil Service examiners. As example is so important in the matter of style, the advice to read as much as possible the works of the best authors is very sound; but it is also desirable that faults of style should be avoided by the writers of instruction books like the one under notice. It may be well to use a euphemism for the word 'drunk,' but the phrase suggested, 'the worse of liquor,' seems rather faulty, and the following sentence respecting the comma is clumsily expressed 'the correct use of it must not on that account be neglected to be studied and observed in the course of one's reading.' As a rule, however, the suggestions are excellent and the mode of expression clear, and worthy of imitation. It is an additional recommendation of the book that it is the work of experienced and successful tutors.

The Royal Upper Class Readers: Great Authors, from Goldsmith to Wordsworth. London: T. Nelson and Sons.

There is no good reason why the reading-books used in the upper classes of elementary and higher schools should not be so framed as to contain a valuable and systematised body of knowledge, and at the same time provide the means of genuine mental culture. The possibility of producing such reading-books is sufficiently proved by the admirable volume before us, the first of a series which thoughtful teachers will be sure to welcome. The great authors dealt with are—Goldsmith, Johnson, Gibbon, Burke, Burns, Cowper, Byron, Scott, Southey, and Wordsworth. Of each of these we have a simple and striking biographical sketch, written in a style so graceful and pleasing that it cannot fail to interest and impress the minds of even young readers, and sufficiently full of detail to present a vivid picture of the life, circumstances, and character of each writer. After each biography is given a chronological summary of the life and works of the author; and then comes a selection from his writings of passages long enough and varied enough to give a fair idea of his style. Thus the pupil has the advantage of being able to study the works of an author in connection with his life, a condition essential to the attainment of all the benefit literary study is capable of affording. Suitable footnotes are added where necessary. The idea of this book and the execution are alike admirable; and we shall look forward with pleasure for the appearance of the further volumes promised. We also hope the time may speedily come when such books as this may take the place, at least in our upper classes, of collections of disconnected odds and ends of literature which form the staple of some elementary reading-books.

Civil Service 'Tots.' By G. E. Skerry. Third Edition.

Copying Tabular Statements with Ruled Forms. By G. E. Skerry. Second Edition. London: Simpkin, Marshall and Co.

These books consist of numerous exercises selected from recent examination papers set by the Civil Service Commissioners, and provide ample practice of a kind essential to success in the various competitions for clerkships and other appointments in Government offices.

The Story of the Nations: Ireland. By Hon. Emily Lawless. T. Fisher Unwin.

Again we have the pleasure of congratulating Mr. Unwin on his particularly happy choice of author for this most difficult portion of his 'Story.'

In her study (as she calls it), Hurrish, Miss Lawless has shown herself not only learned in Ireland and her people, but also imbued with a strong love for the bright sides of their many-sided character.

Our authoress enters upon her difficult task with a certain amount of misgiving, though pretty confident that her affectionate feelings towards them, of whom she writes, will carry her more or less successfully through.

The first chapter is one on Primeval Ireland, where we have a short account of the Formorians, Firbolgs, and amongst others, the probable ancestors of the Danes, who invaded England, viz., the Tuatha-da-Danaans, who arrived under their king Nuad. With regard to these latter, we are told the story of the 'famous pre-historic battle' of Southern Moytura in which Nuad was victorious over the Firbolgs, though he lost his arm, which was replaced by one of silver.

Miss Lawless devotes a chapter to Legends, which she believes, though putting forward no pretence to accuracy, may be more relied on, in the main points, than the so-called history of those days.

The missionary labours of S. Patrick and of S. Columba are well and fairly described and discussed, which accounts are succeeded by those of the persecution of Christians, and of the slaughter of the Danes under Brian Boroimhe.

In Edward III.'s reign we find two distinct Irelands, viz., an English Ireland and an Ireland of the Irish, as proved by the celebrated Statute of Kilkenny, in which there are separate sets of rules drawn up for the one and the other.

However much we might wish to, we cannot afford the space to run through the volume, even lightiy; suffice it to say, the story is told, with more or less hurry, as the centuries roll round, until we come to the end of the last century, when Grattan's Parliament was in full force. The tribute paid to this great man's memory, including some quotations from Sydney Smith's article in the *Edinburgh Review*, will be acknowledged to be most just.

The story is brought down to the present time. It is not perhaps difficult to see on which side Miss Lawless places herself in the present controversy as to the future of Ireland, but all would be bound to acknowledge the excessive fairness of her remarks, and the courtesy she accords to those from whom she may differ.

In conclusion, we think the volume a worthy contribution to the now admired series and heartily commend it to our readers.

Parallel Grammars. (Latin.) By Prof. E. A. Sonnenschein. London: Swan Sonnenschein and Co.

The idea of this series, of which this is the only one at present published, is to show the connection between the grammars of all languages, as far as may be.

The professor is anxious, too, to assimilate the language of the different grammars. So we presume when that of the English language is treated of, we shall have 'of a father' called the genitive case, and 'he was loving' the imperfect tense, and though 'a' or 'an' will be considered a numeral adjective, 'the' will be once more the definite article.

We notice, too, that the editor returns to the old-fashioned method of collecting all the imperative forms into one tense, and not dividing up the mood into a present and a future, as started by the Latin Primer.

This first part, which only contains the Accidence, is to be followed by a second part embracing the Syntax.

The printing is described in the preface as pictorial; which means, that with the aid of different types and dark lines drawn at the side of some of the pages, certain attention is drawn more particularly to the more important matters; and this, we believe, masters and children will find useful.

In lists of verbs, &c., why the editor has not placed them in an alphabetical order we cannot imagine, and we are astonished there is no attempt to connect the different endings of each case of the five declensions.

We shall look for the succeeding volumes with interest, as, until we have seen them, we can say very little of the probable utility of their special feature of parallelism.

A Student's Manual of Psychology. Kirchner, Swan, Sonnenschein and Co.

This manual is adapted from the 'Katechismus der Psychologie' of Friedrich Kirchner. In the author's preface we read that he has attempted to present Psychology to educated persons, more particularly to students, examiners, and teachers, in a popular, though not superficial, manner, his aim being to make the reader thoroughly acquainted with the present state of psychological investigation, and with the difficulties of the individual problems. Looking at the work as a manual for teachers we are disappointed with it. A teacher studies psychology with the same object as a brewer studies chemistry, in order to understand the reasons for the processes he employs. He wants to become familiar with a certain number of principles and the practical application of them. While interesting in themselves, matters of history and speculation are to him of little interest. Much of the volume before us is historical and metaphysical. It is moreover written in a style and phraseology quite unfamiliar to the general English reader, and we venture to say but few students would derive much profit from it, even if they could be induced to read it through. Persons already well versed in the subject would find many interesting facts and inferences, and would be stimulated to thought and reflection, and most likely to criticism.

In regard to many sciences, the German student has the advantage of his English cousin in the matter of excellent text books. Psychology, however, is not one of these. Our own productions are first, and at present there is no second.

Arithmetic Papers, set in the Higher Local Examinations, with Notes on Arithmetic. By S. J. D. Shaw. Deighton, Bell and Co.

Mr. Shaw fills no less an important post than Mathematical Lecturer to the Lady Undergraduates at Newnham. It is only due to him, therefore, to examine with care and respect all that he says which is more or less new on the first principles of number.

This little work of 62 pages is divided into two parts—the first being occupied with the nineteen papers that have been set since 1869, and the second consisting of some notes originally prepared for lecturing purposes. With regard to the latter, there is much in them that is valuable, but from some of the statements we must take exception; *e.g.*, the author says that the expression $3 + 4$ implies that the 4 has *to be* added to the 3, whereas we maintain that it is only another and more cumbrous, but sometimes more useful, way of writing down 7, in which the 4 is not *to be* added to the 3, but *has been* added.

The definition given of multiplication is as follows, viz., 'doing to the multiplicand that which was done to unity to produce the multiplier.' Of course this is not only correct but as applicable to a fractional multiplier as to an integral, but whether a child's mind, and children are referred to in the preface as those for whom after all arithmetics are prepared, would accept and assimilate this is very doubtful.

Though reducing from one scale of notation to another is explained, the method of dealing with radix fractions, of which there are examples in the papers, is not dealt with.

We fancy these notes, though paged to follow the papers, are really an introduction to the larger work which contains full solutions of the papers, as all the references, as they stand, are either incorrect or made to pages which do not exist in the volume before us.

Valuable as the papers are as specimens showing what is expected at Cambridge at the present time, the price of the little work is much too high to make it popular.

In the papers we noticed one or two original questions on racing on circular courses, and we venture to reproduce the following, which we believe is quite a new departure.

A multiplication sum was worked correctly, and then all the figures except those given below were rubbed out, and the lines show the places where the figures rubbed out were ; find all the missing figures.

$$\begin{array}{ccccc} & & 4 & - & - \\ & & & 3 & - \\ \hline & 3 & 6 & - & - \\ - & - & 7 & - & \\ \hline - & - & 3 & - & - \\ \hline \end{array}$$

We cannot too highly commend Mr. Shaw's interesting remarks on recurring decimals, and the practical applications he has made of Fermat's well-known theorem.

The Gospel of Jesus the Christ. S. Luke.

By Rev. J. H. Whitehead, M.A. John Heywood.

This little work of some 90 closely printed pages contains a mass of information—and just such information as is expected to be known by the different examining bodies.

The text is not given ; but the words or sentences explained or commented on are printed in thicker type.

Before however the gospel is dealt with in this way we have four sections of prolegomena as to manuscripts, authorship, peculiarities, with a short account of everyone mentioned in the Gospels, and lists of miracles, parables, &c.

The work concludes with 300 exhaustive questions supplied by the publisher.

The only illustrations are maps, which are not too crowded with names.

The work strikes us as quite as useful as any we have seen prepared on the same subject for the same purpose.

Text Book of Practical Geometry: Solid, Plane, and Arithmetical. By W. E. Crowther. Manchester: John Heywood.

We could not have believed it possible that there was a sufficient number of students in this difficult branch of science to make such a wonderfully cheap book as that before us anything but a commercial failure.

We have no hesitation in saying that had the work, considering how well and carefully it is prepared, both as to letterpress and diagrams, been priced at five times what it is, we should not have been astonished.

We have never seen any work in which the first principles of plan and elevation in orthogonal drawing are more clearly laid down.

Mr. Crowther has evidently the gift of teaching and knows moreover how to put on paper what he would say to a class. The examples are many and varied, and we trust the little work may induce others to take up the subject, or, may be, to retake it up, if they have been frightened from it by its difficulties owing to the want of such a work as the present one.

Botanical Plates. London: A. Johnston.

We are guilty of no exaggeration in describing these plates as the best of the kind which have yet come under our notice. They are nine in number, and illustrate the following types of vegetation :—Common Flax, Deadly Nightshade, Foxglove, Hazel, Meadow Buttercup, Maple, Opium Poppy, Red Lily, and Thorn Apple. They form the first instalment of a long and carefully selected series, comprising many of the most distinctive and familiar plants and trees. Their educational value is undoubted, and may be described as being dependent on two main qualifications—their size, and the accuracy of treatment exhibited. Each sheet measures 35 inches by 25, and as it is entirely devoted to one plant, with enlarged details of its chief parts—flowers, seeds, &c., the scale is large enough to be well adapted for use in large class rooms. As for general design and execution, each plate might be described as a work of art which could well be taken as an example of the modern development of lithographic skill. In drawing they are free and natural, and in colouring harmonious and accurate, with none of those glaring and preposterous tints which so often mar the efforts of lithographic artists. This happy effect is due, of course, to the care taken in the selection of colours, and to the admirable register which has been kept; each stone seems to have deposited its tint in exactly the proper position, so that there is no objectionable overlapping of colours, and the picture accordingly bears the finished appearance of a carefully worked-up water-colour drawing.

'Highly commended' is our verdict with respect to these really beautiful representations of plant life.

The Royal Star Readers. Standard V. and Standard VI. London: T. Nelson and Sons.

These two volumes complete another admirable series of reading-books issued by a firm long noted for the excellence of its educational publications. The book for Standard V. contains a number of interesting biographical sketches—Columbus, Stephenson, Michael Angelo, Peter the Great, Garibaldi, Napoleon, and others, besides a very suitable selection of prose and poetry from eminent English and American writers. Each lesson is followed by a list of the new words it contains, a series of questions, notes, and meanings of difficult words, a summary suitable for a dictation lesson, and a set of exercises in grammar, word-making and composition. At the end of the volume we find poetical pieces adapted for recitation, an alphabetical list of the words contained in the book, and a short course of English grammar and derivation for the standard.

The reader for Standard VI. deserves similar commendation, and would require a very similar description. The lessons are more advanced, and are followed by very complete aids to a thorough mastery of the contents. The last reading lessons consist of extracts from Lamb's Tale of 'The Merchant of Venice,' and the Trial Scene from Shakespeare's play. Analysis and derivation receive special attention. The books are well printed, and suitably bound in smooth red cloth.

Alphabet Sheets. London: Marcus Ward & Co.

This firm is noted for its works in colour. It could hardly be expected that they would issue anything of an inferior character. The Alphabet Sheets before us are among the best specimens of their kind. The letters, both capital and small, are of large size and of good design. Each letter has some natural history illustration accompanying it, and the sheets thus serve a double purpose. Besides being useful for the primary design of teaching the alphabet they will serve for ornament and can be made to illustrate a number of object lessons. They are certain to be appreciated as soon as they are seen.

The Story of the Nations: The Jews. By Prof. J. K. Hosmer. T. Fisher Unwin.

The author of this portion of 'the story' is a Professor of an American University, and though he never forgets he is of English origin, he is naturally proud of his nationality. In speaking of the enduring nature of the Assyrian annals, as written in the houses and temples of Nineveh, he says, 'If we were Assyrians we should take perhaps Kenesaw Mountain, smooth a side of it into a precipice with an overhanging ledge, then, underneath, carve in colossal dimensions the figure of the soldier who won the battle there, and the whole story of the march to the sea. At Richmond would rise an immense pyramid sculptured from base to summit with the achievements of Grant; while at Washington would stand a palace containing a few miles of halls lined with pictured slabs to tell the story of the administration of Lincoln.'

The work is divided into three parts, named respectively, 'The Ancient Pride' 'The Mediæval Humiliation,' and 'The Breaking of the Chain.'

The first chapter begins with a quotation from one of the Psalms of David, which may be taken as an earnest that at any rate to a very great extent the author accepts the story of the Bible as true, though he distinctly says in one place 'it does not belong to him to say whether the (Scripture) narrative shall be accepted without reservation.' This first chapter is an exquisite piece of writing on 'why the story of the Jews is picturesque,' in which he shows the marvellous vitality of the tiny nation at all times of the world's history.

The preparation of the second part of the story seems to have so filled the writer with indignation that he almost glories in any effort made by the afflicted people to revenge themselves, making most interesting remarks on the character of Shylock.

The account of the false Messiah of the seventeenth century will be found very valuable and instructive, being a story but little known to the many. This story is immediately followed by a short account of Spinoza, the one narrative acting as a happy foil to the other.

The third part begins with a chapter headed 'Israel's new Moses.' Many have heard the saying of the great Mendelssohn's father, to the effect that he was the son of the great Mendelssohn, and the father of the greater; but many of the readers of this book will be astonished to find how great a man the elder was who is here designated the new Moses. His early studies produced a curvature of the spine which was never overcome, and his outspoken desire for reform produced for him many an enemy—but deformed and reviled as he was he made his power felt, and even at this day we have to thank him for the somewhat better feeling that exists between Jews and Gentiles.

There are several illustrations, some of which are purely imaginary, *e.g.*, Joseph before Pharaoh, and the Wandering Jew shuddering at the sight of a crucifix, but the maps and sketches of the places as they are are useful, and the whole work is concluded with a copious index.

We cannot do better than conclude this notice with saying how heartily we agree with the author when he says, 'Would that the children of Israel, following their new Moses, the son of Mendel, might all come out into such a Canaan of kindliness, wisdom and breadth of soul; and would that the Gentile world, leaving behind their thousand forms of cruel narrowness, might meet them through gaining a similar loveliness of spirit.'

—o—

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A MONTHLY EDUCATIONAL JOURNAL.

Edited by JOSEPH HUGHES.

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Wisdom is humble that he knows no more.'—COWPER.

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Pestalozzi.

BY THE REV. CANON WARBURTON, M.A.,

Formerly Her Majesty's Inspector of Training Colleges for Schoolmistresses.

CHAPTER II.

FROM the breaking up of the establishment at Neuhof in 1780, eighteen years elapsed before Pestalozzi again attempted to keep a school.

First Writings.

His existence during that period was depressed, poverty-stricken, and at times almost precarious; but it afforded him plenty of leisure for thinking out and maturing his ideas, and making them known to the world by his writings. He was the author of several works, but of these three only need be remembered: it was by them that his reputation was gradually established, and Pestalozzi came to be recognised as the foremost educational thinker and reformer of his time. The names of these works are (1) 'The Evening Hours of a Hermit,' (2) 'Leonard and Gertrude,' and (3) 'How Gertrude Teaches her Children.' The last of these three will be spoken of in its place, later on. The first, which appeared immediately after the collapse of the Neuhof School, was a short paper in the 'Ephemerides,' a journal edited by Iselin, Recorder of Bâle, wherein he states the results of his experience as a teacher, and his views of what education should be. It is neither more nor less than a series of aphorisms, disconnected in form, and altogether destitute of literary skill and arrangement, but bound together by close unity of thought, intention, and subject-matter. They are the fruits of his past experience and reflection, but they contain the seeds of all his future labours and achievements in the cause of education. 'The Ephemerides of 1870,' so he writes some twenty years later, at the zenith of his fame, 'bear witness that the dream of my desires is not more comprehensive now than it was when at that time I first sought to realise it.'

The general tone and character of the 'Evening Hours' may be gathered from a few extracts:—

'All mankind are by nature alike,—they have but one path to contentment,—the natural faculties of each are to be perfected into pure human wisdom.

'The faculties grow by exercise.

'The intellectual powers of children must not be urged on to remote distances before they have acquired strength by exercise in things near them.,

'The circle of knowledge begins close round a man, and from thence stretches out concentrically.

'Real knowledge (*i.e.*, knowledge of facts acquired by experience) must take precedence of word-teaching.

'As the education for the closest relations comes before the education for more remote ones, so must education in the duties of family membership come before education in the duties of citizenship. But nearer than father or mother is God: the closest relation of mankind is their relation to Him.

'Faith in God is the confiding child-like feeling of mankind towards the paternal mind of the Supreme Being. This faith is not the result of cultivated wisdom, but an instinct of simplicity; a childlike and obedient mind is not the consequence of a finished education, but the early and first foundation of human culture. Out of the faith in God springs the hope of eternal life. Children of God must be immortal.

'Belief in God sanctifies and strengthens the tie between parents and children, between subjects and rulers; unbelief loosens all ties, annihilates all blessings.

'Sin is the source and consequence of unbelief; it is acting contrary to the inward witness of right and wrong,—the loss of the childlike mind towards God.

'The loss of this childlike feeling of mankind towards God is the greatest misfortune of all the world; it renders all paternal education on the part of God impossible.

'The restoration of this lost childlike feeling is the redemption of the lost children of God on earth.

'The Son of God, who by suffering and death has restored to mankind the lost feeling of filial love towards God, is the Redeemer of the world; He is the sacrificed Priest of the Lord; His Mediator with sinful man. His doctrine is pure justice, educative national philosophy; the revelation of God the Father to the lost race of His children.'

'Each of these aphorisms,' says one of Pestalozzi's biographers, 'is a text for a discourse; indeed, Pestalozzi's whole life is a paraphrase in act of these texts. We must lay it to the account of human infirmity, if the realisation of his grand anticipations turns out but miserably, nay, only too often stands in glaring contradiction with them. The plan of an inventive architect retains its value even if the architect himself lacks the skill to carry out the building according to the plan.'

Leonard and Gertrude.

Up to this time, and indeed after the publication of his 'Evening Hours,' Pestalozzi appears to have been unconscious of the possession of any literary ability. And even when destitution stared him in the face, and he was compelled to look about for the means of subsistence, it was at the suggestion of a friend that he first tried his hand at authorship. He composed five or six stories, most of which have been long since forgotten, on the plan of Marmontel's 'Moral Tales;' but the last of these, to which he gave the title of 'Leonard and Gertrude,' was the foundation of all his future fame. It was written: as it were, in a vein of inspiration, and without effort. 'The story,' says he, 'flowed from my pen I know not how, and developed itself of its own accord, without my having any plot in my head, or even thinking of one. In a few weeks the book was there, without my knowing exactly how I had made it. I felt its value, but only as a man in his dreams feels the value of some piece of good fortune. I was hardly conscious that I was awake, and yet a new ray of hope began to dawn upon me when I thought that it might be possible in this walk to improve my pecuniary condition, and to make it more supportable to my family.' A friend to whom he showed his MS. pronounced it interesting, but at the same time so insufferably incorrect in language and unpolished in style that it was out of the question to publish it, and suggested that it should be previously revised by some practised writer. 'With no more pretension than a child,' Pestalozzi handed over the MS. to the individual recommended, but, 'what was my astonishment,' says he, 'on receiving the revision! It was a regular piece of divinity student's work, which completely changed the real picture of peasant life, simply and artlessly portrayed by me from nature, into something full of formality and affectation; and made the country-folk at the inn speak a stiff pedagogic language which did not leave a vestige of the peculiarity of my book.' In high dudgeon he betook himself to his former friend Iselin, and timidly tried to gain his sympathy by telling him the story of his wrongs. 'But Iselin's opinion and his conduct,' Pestalozzi goes on to say, 'exceeded all my expectations. He said directly he saw the MS. of the work, "There is nothing like it of its kind, and the views which it advocates are an urgent necessity of our time. As for its defective orthography, that is a matter of minor importance and can soon be set to rights. I will arrange for the publication of the book, and see that you are fittingly remunerated."' Pestalozzi received a louis d'or[*] per sheet, and a louis d'or per sheet seemed like wealth to him in his then destitute condition. When the book appeared, the impression produced by it was extraordinary, extending far beyond the borders of Switzerland. Periodicals reviewed it, the almanacs quoted it; it was discussed in every society, and the Agricultural Association of Berne presented the author with their great gold medal of honour, accompanied with a letter of thanks. 'Pleased as I was with the medal,' he writes, 'and glad as I should have been to keep it, I was nevertheless compelled to part with it, and sold it at a goldsmith's for its value in money.'

The object of the book was, as Pestalozzi himself explains it, 'to bring about a better popular education, based upon the true condition of the people and their natural relations. It was my first word to the heart of the poor and destitute in the land. It was my first word to the heart of those who stand in God's stead to the poor and destitute of the land. It was my first word to the mothers of the land, and to the heart which God gave them, to be to theirs what no one on earth can be in their stead.'

The chief character in the story is Gertrude, the wife of the easy-going nonentity Leonard, and the pillar of his house. Gertrude is the embodiment of Pestalozzi's ideal of the housewife and mother, and the way in which she brings up her children is the way in which he would have all children brought up. Her character and her influence are the lights of the picture, which, on the whole, is a melancholy one, with the sombre background of a peasant community sunk in the deepest depravity.

It was in the endeavour to raise the labouring classes of his countrymen out of this condition by good elementary instruction, that Pestalozzi now recognised the work of his life. 'I desire nothing, and desire nothing else as the object of my life, but the welfare of the people, whom I love, and whom I feel to be miserable as few feel them to be miserable, having, with them, borne their sufferings as few have borne them.'

The friends who surrounded Pestalozzi seemed to have welcomed the success of his book chiefly as a proof that he would be able henceforward to earn his bread as a writer of fiction, ignoring altogether the purpose of the work, and the teachings of the experience which had cost him so dear. But others at a distance showed a deeper insight: invitations reached him from Savoy, from Austria, and from Italy, to settle in those countries, and the offer of a high appointment was made to him by the Grand Duke of Tuscany. The warmest admirer of Pestalozzi will hardly regret that circumstances occurred to prevent his being placed in a position of official or pecuniary responsibility. Lavater, who knew, loved, and appreciated him, is reported to have said one day to his wife, 'If I were a prince, I would consult your husband in everything that concerns the people and the improvement of their condition, but I would never trust him with a farthing of money.'

Of the other works of Pestalozzi published between 1780 and 1798 it would be unprofitable to speak to English readers. During the whole of that period he was a philosopher and a theorist, but in 1798, the memorable epoch of the great French Revolution was to him, as to so many individuals and communities, the turning-point of a career. The revolutionary armies of France overran Switzerland, sweeping away the existing form of government, and all the Swiss cantons were consolidated into 'one indivisible republic,' under five directors, after the French model. Of these directors one, who was named Legrand, was a personal friend of Pestalozzi, and offered him his choice of an employment under the new government. 'I will be a SCHOOLMASTER,' was his reply.

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[*] = 24 francs, or a little less than a sovereign.

At Stanz, 1798-9.

On the 9th of September, 1798, Stanz, in Unterwalden, on the Lake of Lucerne, was destroyed by the French, and the whole surrounding district laid waste with fire and sword; in consequence of which a multitude of fatherless and motherless children were left unsheltered and uncared for in the devastated villages and farms. Legrand now called upon Pestalozzi to repair to the ruins of Stanz, and to create a home and an asylum for the orphans there.

Accompanied by a single woman-servant, he took up his abode in the great Ursuline convent, which was set apart for his use by the authorities, but in a condition quite unfit for the accommodation of a number of children. Gradually he gathered round him as many as eighty wastrels from four to ten years old, 'horribly neglected, infected with itch and scurvy, and swarming with vermin;' their low-browed and inexpressive physiognomy and malign aspect affording a sure index of the mental darkness, the stubborn temper, the hopeless spirits, and the vicious habits on which the teacher would have to work. Not one in ten of them could say the alphabet.

Such were the conditions of this 'educational experiment,' which Pestalozzi regarded as 'a sort of feeler of the pulse of the science which he wanted to improve.' A venturesome effort, indeed! 'A man with the use of his eyes would certainly not have ventured it; fortunately I was blind.'

Pestalozzi gained much of his unrivalled knowledge of children's nature from the Stanz 'experiment,' which can hardly be called a failure, though it came to an end in less than a twelvemonth, and though his unsupported and unaided exertions in giving it a fair trial almost brought him to the brink of the grave. He was not only the teacher and trainer of those eighty children, but 'paymaster, man of all work, hospital nurse, and almost housemaid,—all at the same time; all the help,' says he 'given them in their need, all the teaching they received, came from me; their food was mine, and their drink was mine. I slept in the midst of them; I was last to go to bed at night, the first to rise in the morning.'

From this slavery he was emancipated just in time to save his life, by a change in the fortunes of war. The French army, hard pressed by the Austrians, fell back upon Stanz, and established a military hospital in the convent of the Ursulines. The scholars of Pestalozzi were turned out and dispersed, and he himself went up into the mountains, not so much to rest as to recruit his energies for fresh efforts.

(To be continued.)

How to teach the Babies.

BY JAMES BAILEY.

Head Master of Southlands Training College.

CHAPTER XIII.

SINGING: PHYSICAL EXERCISES: CONCLUDING HINTS.

Singing.—The value of Singing as an instrument in the training of children, is now universally recognised. As a physical exercise, when discreetly managed it is highly conducive to health and to cheerfulness, and in every stage of school life it exerts great power in relieving the strain and pressure of its more severe work. As a disciplinary agent its influence is equally strong and equally valuable. It calms excitement, it promotes unity of feeling and of action, giving oneness and pleasantness of tone throughout the class or the school, and, like music to marching, it infuses spirit and life, as well as regularity, to what, without it, is a mere mechanical exercise. And 'the younger children are, the more and the more frequent the necessity for the relaxation thus afforded; there can be no successful management of the infant school without it' (Currie). The babies' class therefore must have much of it; but the words, the tune, and the whole method of it, must be rightly adapted.

The teaching of Singing necessarily involves the teaching of the words, and the teaching of the music or tune to which the words are set. But it by no means implies that these two parts of the one subject need be, or indeed ought to be taught at the same time. It is only in a somewhat advanced stage of instruction that the combined process can be taken at the beginning without difficulty or confusion. The effort of attention and intelligence necessary to learn the words is quite a sufficient tax upon the powers of young children, without having at the same time to make the further effort involved in learning the tune. The tune, too, can be learnt, as a rule, with much greater precision and ease when sung to the same syllable throughout, than when joined with the words.

In the choice of school songs for the little ones, regard must be had to the suitability of subject and of style. Whether sacred or secular the words and style should be simple, and the subject such as comes fairly within the range of the children's knowledge and sympathies. There is no lack of such, either humorous or serious, descriptive or more directly instructive. In number and variety there is a sufficiently ample choice of pretty, sensible, and suitable pieces, to make it quite unnecessary to resort to the silly, unmeaning words sometimes employed under the plea of their simplicity. In addition to the hymns used for worship in the opening and closing exercises of the school, and in connection with the scripture lessons, school songs will be wanted for singing before and after the various lessons, for singing during the marching and the ordinary physical exercises, and also some special 'Action Songs.' The words of these songs should be carefully taught, apart from the singing of them; with simple and interesting explanation of their meaning. They form, indeed, simple recitation exercises of no mean value, either as exercises for the memory, or as a means of training.

The little ones should be taught to sing them chiefly by the process of imitating the pattern singing of the teacher. But this process must be methodical, sensible, and effective. From the very first the teaching of singing should include *voice training*, and *voice exercises*. Children should be taught how to *distinguish* musical sounds, and how to *produce* them. The principal notes, 'strong tones,' of the scale should be sounded one at a time by the teacher. The attention of the class must be directed to the sound itself, and to the way in which the teacher's mouth is opened so as to produce it. They should then be encouraged to make a similar sound, it may be to the syllable *la*, or, if preferred, to the Sol Fa syllables. I should deem it, however, to be better to keep for a time to the one syllable *la*. The sound, its duration, softness or loudness, repetition at intervals, should all be taught step by step till some degree of precision in these several particulars is secured.

And these exercises in sound-production may even be associated with the use of symbols. It matters little at this stage whether the symbols employed be those of the Staff Notation, or the Tonic Sol Fa Modulator, or the fingers of the left hand used with the intervening spaces to represent the lines and spaces of the ordinary staff scale. The great point is, as an introduction to the teaching of singing by note, to accustom the children to associate the sound with the symbol, so that the tonic, or key-note, being given, the pointing to the finger of the hand, or to the line or letter on the modulator, or to the open note, say semibreve, or the line or space of the scale, shall be at once followed by their giving the sounds, singly, or in due succession.

In teaching a new song and tune the teacher should first sing a verse of it herself, the children looking and listening; when their interest and attention are thus caught, it is well as a rule to teach the tune alone, the teacher taking a phrase or two of it to the syllable *la* only. She should then cause the little ones to imitate her *by themselves*. In this stage of the process the teacher should not sing with the children, they are better trained to accuracy and self reliance by being required to sing alone. When the first phrase or two is fairly mastered, proceed to the next, in the same way, continually revising and adding the part last learnt to the previous parts till the whole tune is known. The next step will be to go through the tune with the words, in a similar manner. Clear and distinct utterance of the words, soft and sweet singing and correct time should be aimed at from the first efforts of the children, and may be secured in reasonable degree, even with the youngest. 'Action Songs' are popular and highly appropriate with Infant Classes. Care should be taken to find such action and gesture as is suitable to the sense of the words; it should be natural, easy, and spirited in its application, and should be thoroughly taught with the words before using it in the singing.

Physical Exercise, or *Drill*, as it is now often called, must not only be frequently interspersed among other lessons, as an agreeable variety and relief, but must have its own special lessons. Some reasons for this, and some considerations regarding it, have been set forth in an early chapter of this series, and it has been incidentally referred to in connection with the treatment of 'Action Songs.'

There should be short, simple, natural exercises of various sorts. The children should be taught how to stand, to sit, to rise in concert, either at the teacher's word, or the motion of her hand, or other definite signal. Some such series of simple movements as are systematized in the easier exercises of what is known as 'Swedish Drill' should be followed. The lifting of the arms and hands right and left alternately and together, the extension of the arms forward or upward till both hands meet, the straightening of the body, so as to stand erect, the bending it in various directions, so as to exercise duly in turn all the muscles, the turning upon the heels, the marching in line and column, when done discreetly and shared throughout by the sympathetic action of the teacher, are delighted in by the little ones, and are an admirable means of training both of health and of discipline.

Where there is a playground suitable games should be devised and shared in heartily by the teacher. Indeed the children should never be left, either there or in the schoolroom, without the teacher's presence. The playground is an excellent field, too, for the exercise of most effective moral discipline. The children are free from the restraints of the schoolroom, and are likely there to display freely their natural tendencies and dispositions for good or evil. This makes it a valuable occasion for the watchful care of the observant teacher. Wrong doing can be checked, right doing can be fostered, and the process of practical moral training enforced under circumstances most favourable for its exercise.

General Hints.—Closely connected with the health and comfort and well being of the children are other matters which will not escape the notice of a thoughtful teacher. Their personal cleanliness and personal habits, the disposal of caps and outer clothing, so that if wet it may be dried before being worn again, the watchfulness necessary in regard to symptoms of illness, especially of infectious diseases, attention to the little ailments and accidents almost inseparable from the school life of children, and other circumstances expected and unforeseen, make great and constant demand upon the patience, tact, good sense, and general resources and skill of the Infants' Teacher. And the daily exercise of these precious qualities brings a rich reward to her who lovingly expends them, as she observes the fruit of her efforts in the gradual unfolding and development of intellect and of life in her young charge. How truly, as Canon Norris once observed in an address to teachers, the value of a school depends 'on the life that is lived in it,' on 'the heart and love and healthy moral influence at work' there.

I have again and again in the course of these chapters laid stress on the necessity of adapting all processes of instruction and discipline to the requirements of a child's nature. No teacher deals rightly with a child who does violence to that nature. Training and guiding, and controlling, it truly needs, but careful observation of its methods of acting, and due regard to what it shows us, are the true indications to the path of success in dealing with it. I have already strengthened points which I have endeavoured to set forth, by quotations from Dr. Fitch's 'Lectures on Teaching.' There is in his chapter on School Discipline a paragraph bearing so admirably on the matter last referred to, that I will emphasize it also in a similar manner.

'In governing it is of the last importance that we should well consider the nature of the being whom we want to control, and not demand of him an impossible standard of virtue. A little child has not your seriousness nor your sense of duty, nor your capacity for sitting still. He would be a very curious, almost an unpleasant phenomenon, if he had. On the contrary nature makes him physically restless, very curious, mobile, and inquisitive, and exceedingly deficient in reverence. And these qualities should be taken for granted and allowed for, not set down as faults. Provision should be made for giving lawful vent to his personal activity, and if such provision be not made, and he is called on to maintain a confined posture for an unreasonable time, his restlessness and disobedience are his teacher's fault not his. Let us take for granted that in every fault of a child there is an element of good, "would men observingly distil it out," that every act of mischief he is guilty of is only an example of perfectly healthy and legitimate activity, accidentally misdirected, and above all let us take care not to measure his fault by the inconvenience which it causes us, but rather by considering the motives and the causes of it. Some of the little wrong acts of a child which bring the most annoyance to a teacher and try his temper most are precisely those which from the point of view of a moralist are least blameworthy—talking at unreasonable times, destructiveness, untidiness, noise. These things have to be checked of course. But do not let us confuse the conscience of a child by exaggerating their seriousness or by treating offences against school rules as if they were breaches of the moral order of the universe. Consider what are the natural instincts of a child, and how unformed his moral standard is, and you will see that relatively to him offences of this kind are not crimes, though relatively to you and to the school they may be serious annoyances.'

(The end.)

Jeanne d'Arc, by Lamartine.

TRANSLATED BY A. M. BOWER,

Late Master in University College School, London.

VI.

JEANNE D'ARC.	JOAN OF ARC.
C'était en 1409.	It was in 1409.
La France se décomposait	France was being disintegrated
avant d'avoir été achevée.	before being constituted a kingdom.
Cette grande monarchie,	This great monarchy
qui n'était presque plus	which had become little more
qu'une confuse fédération	than a confused federation
de vassaux indépendants	of independent vassals
et souvent rivaux de la couronne,	and frequently rivals of the crown
était tombée en lambeaux et en anarchie.	had fallen into pieces and into anarchy.
En perdant son unité,	While losing its unity,
elle allait perdre son indépendance.	it was going to lose its independence.
Le ciel l'avait frappée de deux fléaux :	Heaven had smitten it with two scourges :
une reine perverse et un roi insensé,	a perverse (obstinate) queen and a mad king,
un interrègne et une régence.	an interregnum and a regency.
Dans une monarchie, les interrègnes	In a monarchy, interregnums
sont les évanouissements de l'autorité,	are the eclipses of authority,
les régences sont	regencies are
les gouvernements de la faiblesse.	governments of weakness.
Une seule de ces conditions	A single one of these conditions
suffit pour perdre une nation.	is sufficient to destroy a nation.
Tout gouvernement est préférable	Any government is preferable
à ces gouvernements sans possesseurs	to these governments without governors
et disputés par l'intrigue ou	and contested by intrigues or
par les armes entre des partis ambitieux.	by arms among ambitious factions.
Charles VI. était roi de nom.	Charles VI. was king in name.
Frappé de démence par la terreur	Struck with madness by the fright
qu'il avait éprouvée	which he had received
en échappant avec peine à la mort	while escaping with difficulty from death
dans une fête	at a feast
où ses compagnons de plaisir et lui	in which his companions in pleasure and himself
s'étaient enduits d'étoupe et de résine	had covered themselves with tow and with resin
pour imiter les brutes,	in order to imitate wild beasts,
et où quatre de ses courtisans	and in which four of his courtiers
avaient été consumés sous ses yeux,	had been burnt to death under his eyes,
il languissait dans un idiotisme	he lingered in a state of idiotcy
interrompu par des fureurs	broken by fits of fury
ou par des abattements	or by prostrations
qui le rendaient semblable à un enfant.	which reduced him to the state of a child.
Il avait épousé Isabeau de Bavière.	He had married Isabeau of Bavaria.
Cette reine, douée par la nature	This queen, endowed by nature
de la beauté des Poppée et des Théodora,	with the beauty of Poppaea and Theodora,
ces courtisanes élevées au trône par le vice,	these courtesans raised to the throne by vice,
en avait aussi les légèretés,	inherited also their levity,
les perversités et les ambitions.	their perversity and ambition.
A peine cette jeune princesse	Scarcely had this young princess
était-elle montée sur le trône,	mounted the throne,
qu'elle avait pressenti	than she had foreseen
dans son mari la puérilité d'esprit	in her husband the weakness of mind
qui devait bientôt dégénérer en démence.	which was soon to degenerate into madness.
Livrée, par les mœurs corrompues	Given up by the corrupt manners
de cette époque et de cette cour,	of this period and of this court,
au tourbillon des plaisirs les plus emportés,	to the vortex of the most unrestrained pleasures,
elle avait ressenti	she had felt
une passion coupable et politique	a culpable and politic passion
pour le jeune duc d'Orléans frère du roi.	for the young Duke of Orleans, brother of the king.
Ce prince, plus fait	This prince, more fitted (*made*)

par son courage pour le trône,	by his courage for the throne,
plus fait par sa grâce	more suited by his grace
pour séduire le cœur d'une femme,	to win the heart of a woman,
avait partagé par inclination	had shared from inclination
et par ambition cette ardeur.	and ambition this passion.
Une orgie nocturne,	A night revelry,
à la suite d'une mascarade,	following a masquerade,
avait préludé au crime.	had been the forerunner of this crime.
Depuis cette époque fatale,	Since this fatal moment,
le duc d'Orléans et la reine,	the Duke of Orleans and the queen,
unis de passion,	united in passion,
de crime et d'intérêt, régnaient.	crime and interests, reigned.
Les grands vassaux, les oncles du roi,	The great vassals, the uncles of the king,
le duc de Bourgogne, le duc d'Anjou,	the Duke of Burgundy, the Duke of Anjou,
le duc de Bretagne, jaloux de ce règne	the Duke of Brittany, jealous of this reign
qui leur enlevait l'exploitation du royaume,	which took away from them the government of the kingdom,
avaient entraîné dans leur cause	had led away in their cause
le fils encore enfant du roi.	the infant son of the king.
Dans ces jours de férocité,	During these terrible days,
qui rappelaient l'ancienne Rome	which recalled (the memory of) ancient Rome
par les meurtres	by the assassinations
et la nouvelle Italie par les conjurations,	and modern Italy by the conspiracies,
toutes les intrigues se dénouaient	all intrigues ended
par des assassinats	in assassination.
Le duc d'Orléans, appelé	The Duke of Orleans, called out
une nuit sous un faux prétexte,	one night under a false pretence,
et sortant du palais de la reine,	and (on) leaving the palace of the queen,
est renversé de son cheval	was unhorsed
et frappé de treize coups de poignard	and stabbed with thirteen blows of the dagger
par vingt hommes inconnus,	by twenty unknown men,
qui laissent son corps sanglant dans la rue,	who left his bleeding corpse in the street,
à la porte de son hôtel.	at the door of his hotel.
La rumeur publique accuse	The public rumour accused
le duc de Bourgogne du crime,	the Duke of Burgundy of the crime,
le jeune Dauphin d'acquiescement,	the young Dauphin of acquiescing therein,
ses partisans de complicité.	his partisans of complicity in it.
La reine, qui perd à la fois	The queen, who lost at once
son amour et sa force,	her lover and her support,
jure de laver ses larmes	swore to wash her tears
dans le sang du meurtrier.	in the blood of the assassin.
Elle se ligue avec le connétable d'Armagnac,	She allied herself with the constable of Armagnac,
beau-père du duc d'Orléans assassiné,	father-in-law of the murdered Duke of Orleans,
contre le duc de Bourgogne.	against the Duke of Burgundy.
Les d'Armagnacs, famille sanguinaire,	The D'Armagnacs, a bloodthirsty family,
proscrivent, massacrent, sont proscrits	proscribe, massacre, and are proscribed
et massacrés tour à tour dans Paris.	and massacred in their turn in Paris.
Servant et dominant à la fois la reine,	Serving and at the same time domineering over the queen,
leur instrument et leur victime,	their tool and their victim,
ils s'alarment de l'ascendant	they become alarmed at the ascendancy
d'un nouveau favori, le jeune Boisbourdon.	of a new favourite, the young Boisbourdon.
Ils osent l'immoler aux pieds de la reine,	They dare to murder him at the feet of the queen,
pour régner seuls en son nom.	so as to govern alone in her name.
Désespérée de la mort, furieuse du crime,	In despair at his death, enraged at the crime,
humiliée du joug, Isabeau sacrifie	humiliated at the yoke, Isabeau sacrifices
ses ressentiments passés à sa haine présente.	her past resentment to her present hatred.
Elle conspire avec le duc de Bourgogne	She plots with the Duke of Burgundy
la perte et la mort des Armagnacs,	the destruction and death of the Armagnacs,
et lui vend à la fois	and barters away to him
leur sang et son cœur,	at once their blood and her heart,
en échange de la vengeance	in exchange for the vengeance
qu'elle attend de lui.	which she expects from him.
Le duc de Bourgogne rentre	The Duke of Burgundy enters,
à la faveur de cette trame dans Paris,	thanks to this plot, into Paris,
immole les Armagnacs,	butchers the Armagnacs,
satisfait et assujettit la reine,	satisfies and overrules the queen,
prend la tutelle du roi,	assumes the guardianship of the king,
combat dans les provinces	combats in the provinces
contre les restes du parti contraire	against the remains of the opposite party
unis aux Anglais.	united with the English.
Les Français, ainsi déchirés en factions,	The French, thus torn by factions,
succombent à la bataille d'Azincourt	are beaten at the battle of Agincourt
qui livre la patrie au roi d'Angleterre	which gave up the country to the king of England
sur les cadavres de la noblesse française.	over the corpses of the French nobility.
Sept princes de la maison royale	Seven princes of the Royal house
sont ensevelis sur ce champ de bataille.	were buried on the field of battle.
Le fils aîné du roi meurt de douleur ;	The eldest son of the king died of grief ;
son frère, du poison versé dans ses veines	his brother, of poison poured into his veins
par les ennemis des Bourguignons.	by the enemies of the Burgundians.
Le troisième fils du roi, alors Dauphin,	The third son of the king, then the Dauphin,
devenu plus tard Charles VII,	(who) became later Charles VII.,
grandit dans cette alternative	grew up in such changes
de mollesse et de proscriptions,	of effeminacy and proscription,
qui rappelle Rome par le sang	as to remind one of Rome for the blood (spilt)
et les Gaules par la légèreté.	and the two Gauls for the levity (displayed).
Il s'essaie à gouverner	He tries to govern
avec les Armagnacs.	with the Armagnacs.
Il affecte la lassitude de la guerre	He affects a weariness of the war
et la soif de la paix.	and a thirst for peace.
Il décide avec peine	He persuaded with difficulty
le duc de Bourgogne à une entrevue,	the Duke of Burgundy to an interview,
prélude d'une réconciliation générale	the prelude to a general reconciliation

des princes et des partis,	of the princes and parties,
sur le pont de Montereau.	on the bridge of Montereau.
Le duc de Bourgogne,	The Duke of Burgundy,
poursuivi par l'ombre de sa victime,	pursued by the shade of his victim,
le duc d'Orléans, hésite et craint	the Duke of Orleans, hesitates and fears
un piège dans son triomphe.	a snare in his triumph.
On l'entraîne, il entre	They drag him reluctantly there, he enters
dans le pavillon de la conférence,	into the pavilion of the conference,
il y tombe à l'instant	he falls instantly there
sous la hache de Tanneguy du Châtel.	under the axe of Tanneguy du Chatel.

(To be continued.)

Our Certificate Class.

BY DR. GEORGE BEACH.

Head Master of Christ Church School, Macclesfield.

The last (March) number of the PRACTICAL TEACHER was of peculiar service in the prosecution of our design. We would call our readers' attention to the articles on I. Technical Instruction, II. Pestalozzi, III. Size and Shape of the Earth (Notes of Lessons), IV. Model Answers to Certificate Questions (1887), and V. Parallel Translation of Jeanne d'Arc. In our list of books we omitted to mention the Clarendon Press Comus, McLeod's Constitutional History, Elsom's Stocks (published by Elsom, Hull). We would also more particularly recommend Davies' three Historical Manuals, 1689—1760, 1760—1815, and 1760—1815 (Literature).

Our routines for April specify the actual amount of work to be done during that month. The information given and the analysis of School Management inserted, have been compiled after a careful study of eighteen years' questions. This Analysis includes every question (about 250),and nothing besides, given since 1869, and is thus exhaustive although not superfluous. To students in training (who do not require our routines) it should be very serviceable.

There is a very natural desire for information respecting the marks given for and the relative value of each subject, etc. It is significant that the Department has shown upon these points an increasing reticence. In the Syllabus for 1874 were given, A, the number of marks requisite for the various divisions of Certificates; B, the different Standards of proficiency required from acting-teachers and students in training; C, the number of marks given for each subject; D, the failing subjects. In the 1875 Syllabus the information under heads 'C' and 'D' was withheld. Next, in the 1878 Syllabus only the failing subjects were specified; and since 1883 no enlightenment on the above four points has been published.

Latest Information under Heads 'A' and 'B'

		By Acting-Teachers	By Students in Training
Percentage of marks requisite to obtain a Certificate of	1st Division	63	64
	2nd ,,	49	52
	3rd ,,	33	36
	4th ,,	27	30

Latest Information under Head 'C'

Reading	100 marks	Geography	62 marks
Penmanship	75 ,,	History	63 ,,
School Management	75 ,,	Political Economy	62 ,,
Teaching	125 ,,	Music	88 ,,
Composition	50 ,,	Drawing	62 ,,
Mathematics	225 ,,	Languages	125 ,,
Grammar	63 ,,	Sewing and Cutting out	100 ,,
Domestic Economy	63 ,,		

(There is reason to believe that the marks for the separate subjects are more nearly equal now than they were, especially the alternative subjects.)

Latest information under head 'D' shows that Reading, Penmanship, Arithmetic, Composition, Spelling, Parsing, and School Management were the failing subjects; and from internal evidence and a collation of the current opinion of specialists, we believe them still to be of paramount importance.

Therefore commencing first with SCHOOL MANAGEMENT, special hints will be from month to month given with respect to these subjects.

SCHOOL MANAGEMENT.—Doubtless a teacher before assuming responsibility should be saturated with Mental and Moral Philosophy, and certainly the Department are slowly inclining to this view. Yet we shall not be guided by our own utopian ideas of what should be but shall proceed in accordance with the system in vogue, having for our chief aim the assisting the student to 'PASS HIS EXAM.'

On analysing, it will be found that at least half the questions can be answered without special study by an experienced 'Practical Teacher,' and of this portion, the questions upon 'REGISTRATION AND RETURNS' are the most easily 'spotted.

If our readers understand—what registers are required—who should keep them—who is responsible for them—what particulars they contain—why these particulars are necessary—why no erasures are allowed—how the registers can be verified—how errors may be rectified, or incomplete attendances cancelled—the exceptions caused by Religious Examinations or elections—the way to mark an attend. register—when a scholar has *bona fide* left—what qualifies a scholar for entrance on Exam. schedule—how to draw up specimen registers—how to fill up Form IX. —how to keep a log book; then they will be impregnable under the above 'head.'

ORGANISATION AND MANAGEMENT.—The candidates must also know—what is meant by organisation—the principles of the various systems of classification—when to examine—how to organise a school, or draw up a routine, with the minimum staff, with the maximum curriculum, so as to provide the P. T's with practical training, to diffuse equally the Head-Master's influence, and to suit the locality.

PROCESSES OF REASONING, HABITS AND CHARACTER, MORAL DISCIPLINE.—The chief points here to attend to are—the best books with which to commence and continue this study —what mental powers are exercised by particular subjects—the laws and provinces of memory, attention, association of ideas, the inventive faculty, and imagination—the various methods of reasoning by induction (synthesis), deduction (analysis), inference and analogy—the various forms of fallacy—the terms syllogism, hypothesis, demonstration, converse proposition, sense, sensation, sensibility, sensitiveness, perception, conception, intension, extension, convertible terms, reductio ad absurdum, reductio ad exhaustum—the meanings of habit—the meanings of character —the area of the teacher's influence—how to inculcate moral, prudential, regular, and healthy habits, as truthfulness, thrift, punctuality and cleanliness—the theory of punishments as to kind, amount and time of administration—how to eradicate particular vices—and the advantages and dangers of prizes, competition and emulation.

ANSWERS TO CORRESPONDENTS.

We shall be pleased to reply briefly, and through this column, to any seeking information or advice.

PRIVATE STUDENT.—Yes. Get a tutor by all means, but we cannot undertake to recommend any particular one. Amateur 'coaches' will however save themselves much mental labour by using our Routines.

J. W.—We hope to assist 'collegians' somewhat, as well as acting-teachers. See our second paragraph of this month's paper.

ROUTINE FOR APRIL. (MALES.)

DAY	FIRST WEEK			
MONDAY	Articles 81 to 86 of Code. Articles 1 to 7 of Circular No. 217 (page 91 of Heller's Code). First half of p. 128 (Heller's Code)	First thirteen Propositions of Euclid, Book I.	Paraphrase Lines 32—56 of Cæsar, Act I. Scene I.	
TUESDAY	Possessions in Europe, including Cyprus	Square Root	Outlines of English History to end of Stephen	
WEDNESDAY	Involution and Evolution of Algebra	To end of page 20 of Jevon's Logic Primer	Deductions, 13, 14, 16, 19, 20, 23, 25, 26, 31, 36, of Egan, Part I.	
THURSDAY	Write 30 lines of Composition upon 'It is meet that noble minds keep ever with their likes'	Write a 'Text Hand' copy of the word 'Communion' and a copy of 'Small Hand'	First twenty-six Propositions of Euclid, Book I.	
FRIDAY	Notes of Cæsar to page 124, or to 85th line of Act II. Scene I.	Shape and size of the Earth (page 9 of March Number)	Mensuration of Squares, Rectangles, and surfaces of Rectilinear Solids	
SATURDAY	Important Dates to end of Stephen	Notes of Cæsar up to page 124, or to 85th line of Act II., Scene I.	G.C.M. (H.C.F.), and L.C.M. of Algebra	Site of School. To end of page 27 of Carpenter's Hygiene

DAY	SECOND WEEK			
MONDAY	Deductions, 40, 45, 52, 58, 60, 64, 69, 74, 82, 83, of Egan, Part I.	Paraphrase first seventeen lines of Comus	Physical Features of England	
TUESDAY	Cube Root of Arithmetic	First two chapters of McCarthy, or from 1837 to the 'Bedchamber Question'	Notes of a Reading Lesson to Standard I.	
WEDNESDAY	Surds (Algebra)	First forty-one Propositions of Euclid, Book I.	Write a short life of Shakespere for future use	
THURSDAY	Cyprus, and Mountains of Hindostan	Stocks	Tables of Norman and Plantagenet Dynasties	
FRIDAY	Revise Algebra	Canon Warburton's Article on Pestalozzi in our March issue	Deductions, 92, 101, 105, 107, 110, 113, 115, 118, 121, 128, of Egan, Part I.	
SATURDAY	Notes of Comus to line 169	Learn what Registers are necessary and what information the Admission Register must contain	Euclid, Book I.	Mensuration of Parallelograms and Triangles

DAY	THIRD WEEK			
MONDAY	Write out, for future use, the plot of Comus	Physical Map of England	Third and fourth chapters of McCarthy, *i.e.*, to close of A.D. 1842	
TUESDAY	Study the Syntax of Nouns	Revise Algebra	Feudal System and Constitutions of Clarendon	
WEDNESDAY	Deductions, 135, 137, 148, 151, 156, 163, 165, 168, 175, 179, of Egan, Book I.	Paraphrase (page 2 of Essay on Milton) 'By the general suffrage......... which defy imitation'	Causes which affect Climate. Findlater, Part I., pp. 116—124	
THURSDAY	Interest	Fifth, sixth, and seventh chapters of McCarthy, *i.e.*, to the 'Irish Famine'	Ratios (Algebra)	
FRIDAY	Flora and fauna of the Torrid Zone	First ten Propositions of Euclid, Book II.	Write thirty lines of Composition comparing Shakespeare and Milton	
SATURDAY	Physical Features of Scotland	Discount	Outlines of English History to end of Richard I.	G.C.M. and L.C.M. of Algebra

DAY	FOURTH WEEK			
MONDAY	Write out a list of Good Habits with their opposing Bad Habits	Deductions, 313, 315, 317, 321, 327, 329, 334, 341, 343, 346, of Egan Part I.	Study the Syntax of Nouns	
TUESDAY	Euclid, all Book II.	Notes and Text of Comus, to line 330	Infectious Disease, Wounds, and Cutaneous Disorders. (Carpenter. pp. 163—202)	
WEDNESDAY	Rivers of Hindostan with Towns thereon, etc.	Mensuration of Right-Lined Surfaces	Revise 'McCarthy,' *i.e.*, English History from 1837 to 'Irish Famine'	
THURSDAY	Notes and Text of Cæsar, to 85th line of Act II. Scene I.	Cube Root of both Arithmetic and Algebra	Notes of a Writing Lesson to Standard VII.	
FRIDAY	Deductions, 352, 359, 363, 364, 366, 369, 371, 374, 378, 388, of Egan, Part I.	Read carefully through half the Essay on Addison	Physical Features of Ireland	
SATURDAY	Discount	Important Dates to end of Richard I.	Revise Algebra	Write, *for future use*, a Summary of Canon Warburton's Article on Pestalozzi

ROUTINE FOR APRIL. (FEMALES.)

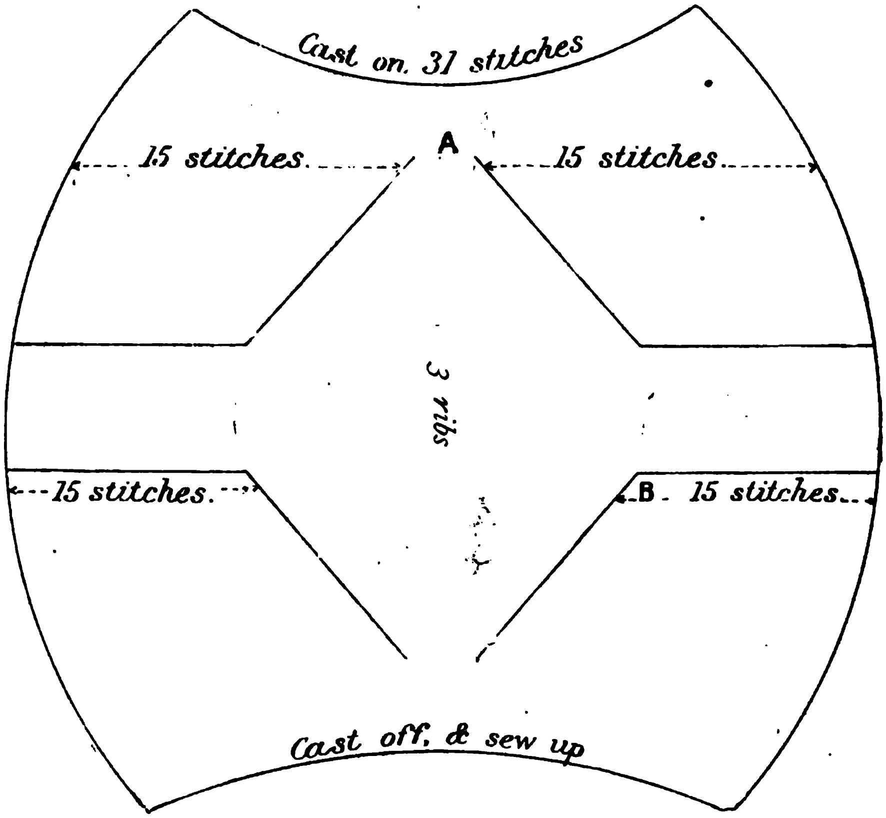
DAY	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
MONDAY	Articles 81 to 86 of Code. Articles 1 to 7 of Circular No. 217 (page 91 Heller's Code) First half of page 123 Heller's Code.	Analyse, and Parse difficult words of, Lines 306—318, of Cæsar Act I. Scene II.	Physical Features of England	Marlborough's Campaigns	Interest	Political Geography of Hindostan	The different diets required in the different disorders	To end of page 20 of Jevon's Logic Primer	Map of British North America	Stocks	Geography of Canada	Write a short life of Shakespere for future use
TUESDAY	Union of England and Scotland. The 'Place Act.' Trial of Dr. Sacheverell	Vulgar Fractions	Paraphrase Lines 32—56 Cæsar Act I., Scene I.	Physical Map of England	How should an Artisan's wage of 30/- be spent in a family of five?	How should a woman's nightdress be made?	Site of School. To end of page 27 of Carpenter's Hygiene	Discount	Outlines of Geography of British North America	Outlines of Anne's reign	The average waste in, and average food required by, a healthy adult	Cut out on Sectional Paper and tack together the sleeve half of 'a muslin pinafore'
WEDNESDAY	The essential constituents of a true food	Notes of a Reading Lesson to Standard I.	Learn the measurements of 'A woman's nightdress'	Queen Anne's Bounty. Inventions and Improvements	Insurance (Arithmetic)	Syntax of Nouns	Geography of Scotland	The ordinary beverages	Canon Warburton's Article on Pestalozzi in our March number	Notes of Cæsar as before	How should a muslin pinafore be made?	Learn what Registers are necessary and what information the Admission Register must contain
THURSDAY	Map of Hindostan	Practise the different stitches on a piece of linen 9 inches square	Decimal Fractions	Infectious Diseases, Wounds and Cutaneous Disorders (Carpenter 163—202)	Advantages of a mixed diet of flesh and vegetables. Disorders from improper Diets	Lives and works of Wycherley, Congreve, Cibber, Young, Ramsey, Tickell	Analyse, and Parse difficult words of, Lines 66—78 of Cæsar Act II. Scene I.	Conquest of Canada and Life of Wolfe	Square Root	Geography of Ireland	How would you make Beef Tea, Gruel, and Barley Water?	Discount
FRIDAY	Describe a house and its furniture which can be maintained for 30/- per week in a small town	Proportion	Amalgamation of the East India Companies. Treaty of Utrecht. Gibraltar.	Paraphrase Lines 31—47 of Act I. Scene II. Cæsar	Cut out on Sectional Paper and tack together the right half of 'a woman's nightdress'	Notes of a Writing Lesson to Standard VII.	How can a working-man best invest a few pounds annually?	Write 30 lines of Composition upon 'It is meet that noble minds keep ever with their likes'	Practise the different stitches on a piece of calico 9 inches square	Write out a list of Good Habits with their opposing Bad Habits	Select any peculiar expressions or familiar phrases from first half of Addison	Outline of George I. reign

DAY	FIRST WEEK				SECOND WEEK				THIRD WEEK				FOURTH WEEK			
SATURDAY	Describe the chief characteristics of Macaulay's style of Essay writing	Riot Act. Septennial Act. Poor Law Act	Learn Physical Features of Hindostan	Write a 'Text Hand' copy of the word 'Communion' and twenty lines of 'Small Hand'	Stocks	Notes of Cæsar to page 124 or to 85th line of Act II. Scene I.	How should 'Food for Sick' differ from ordinary food?	Practise Stocking-web and a Print Patch	Insurance	Notes of Cæsar to page 124, i.e., to line 85 of Act II. Scene I.	Learn the measurements and draw a diagram of 'a muslin pinafore'	Naval operations from 1700 to 1727	Syntax of Nouns	Remaining Geography of British North America	Square Root and Fourth Root	Draw up for future use a Summary of the article on Pestalozzi

Knitting Maps.

BY MRS. J. D. HARRIS.

Lady's Knee Cap.



2 Bone pins. No. 11 Chamber's bell gauge.

2 oz. Berlin fingering.

Knee caps are far more elastic and comfortable if they are ribbed, than when knitted plain.

2 rows plain, and 1 purl, make a good rib.

The increasings and decreasings for the knee gusset are always made on the right side. The reverse row is to be plain or purl according to the rib, except the gusset, which should be knitted plain.

Cast on 31 stitches.

Knit 3 ribs.

To increase for Gusset.

A. Knit 15. Raise a stitch. Knit 1. Raise 1. Knit 15. In the reverse row it will be knit 3 in the gusset, and of course 2 more stitches in each succeeding row.

Repeat from A. (knitting the stitches between the 2 raised stitches) till you have 56 stitches in all on your pin.

Knit 3 ribs.

To decrease.

B. Knit 15. Knit 2 together. Knit to within 17 of the end. Knit 2 together. Knit 15.

Repeat from B. (on the right side) till you have reduced to 31 stitches.

Knit 3 more ribs, cast off, and sew up the seam.

Model Answers to Certificate Questions, Christmas, 1887.

Male Candidates.

FIRST YEAR.

Euclid.

(Two hours and a half allowed for this Paper.)

Candidates are not allowed to answer more than EIGHT questions.

Capital letters (*excluding A, B, C, D, E, F*), not numbers, must be used in the diagrams.

The only signs allowed are + and =.

The square on PQ may be written 'sq. on PQ,' and the rectangle contained by PQ, and RS, 'rect. PQ, RS;' other abbreviations, if employed, must not be ambiguous.

1. From a given point, to draw a straight line equal to a given straight line.

When the given point is neither in the given line nor in it produced, in what different ways may the straight line be drawn?

Proposition 2, Book I.

When the given point is neither in the line, nor in the line produced, the problem admits of *eight* different lines being drawn from the given point in different directions, every one of which is a solution of the problem.

(1) The given point may be joined with either extremity of the given line.

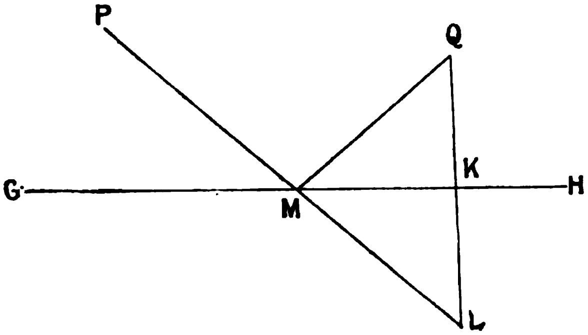
(2) The equilateral triangle may be described on either side of these two lines, giving four equilateral triangles.

(3) In each of these triangles the sides may be produced either through the vertex or through the base, thus giving eight variations of the figure.

2. If two straight lines cut one another, the vertical, or opposite angles shall be equal.

From two given points on the same side of a given line, draw two lines which shall meet in that line and make equal angles with it.

Proposition 15, Book I.



Let P, Q be the given points and GH the given line.

Construction.—Draw QK perpendicular to GH (I. 12), and produce QK to L (Post. 2), making KL = QK. (I. 3.)

Join PL cutting GH in M, and join QM. (Post. 1.)

Then PM, QM shall be the lines required.

Proof.—In the triangles QKM, LKM, side QK = side LK (Con.), side KM is common to the two triangles, and angle QKM = angle LKM (Ax. 11), therefore base QM = base LM (I. 4), and angle QMK = angle LMK.

But angle PMG = angle LMK (I. 15), therefore angle PMG = angle QMK. (Ax. 1.)

Wherefore the lines PM, QM make equal angles with the given line GH.

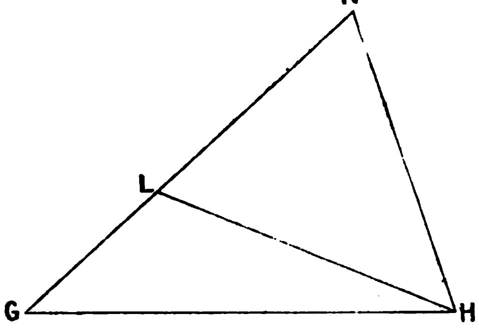
Q. E. F.

3. At a given point in a given straight line, to make a rectilineal angle equal to a given rectilineal angle.

Construct a triangle, having given one side, an adjacent angle, and the sum or difference of the other two sides.

Proposition 23, Book I.

(*a*) Sum of the other two sides.



Let GH be the given side, HGK the given angle, and GK the sum of the other two sides.

Construction.—Join KH. (Post. 1.)

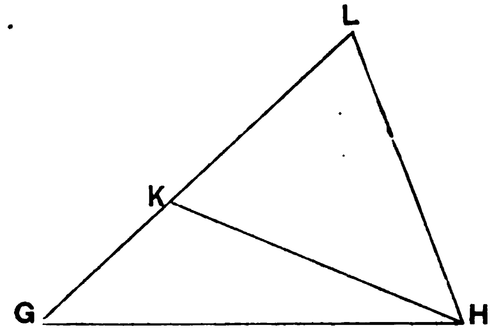
At the point H make the angle KHL = angle HKL. (I. 23.)

Then GLH shall be the triangle required.

Proof.—Because angle LHK = angle LKH (Con.), therefore LH = LK (I. 6); wherefore sum of GL and LH = GK, therefore GLH is the required triangle.

Q. E. F.

(*b*) Difference of the other two sides.



Let GH be the given side, HGK the given angle, and GK the difference of the other two sides.

Construction.—Join KH. (Post. 1.)

Produce GK to L (Post. 2), and at the point H make the angle KHL = angle HKL. (I. 23.)

Then GLH shall be the triangle required.

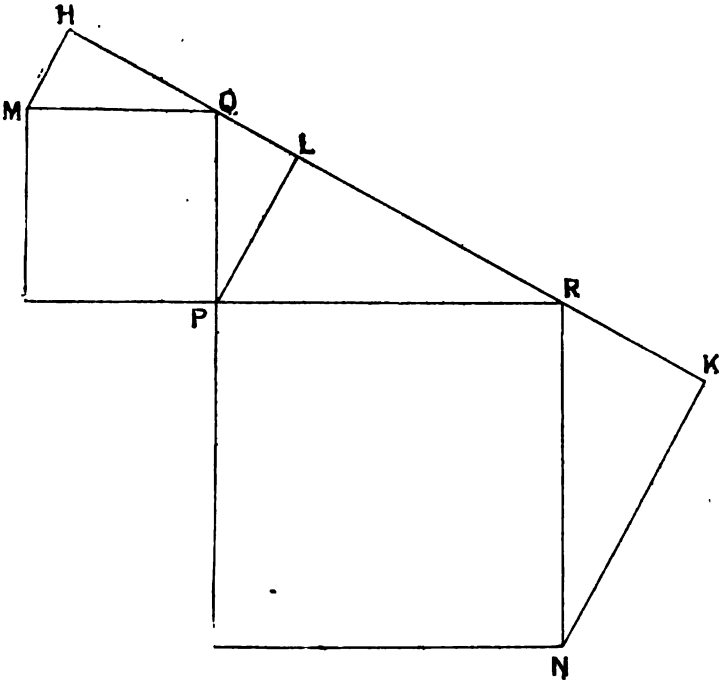
Proof.—Because angle LHK = angle LKH (Con.), therefore LH = LK (I. 6); wherefore difference between GL and LH = GK, therefore GLH is the required triangle.

Q.E.F.

4. If two triangles have two angles of the one equal to two angles of the other, each to each, and one side equal to one side, namely, sides which are opposite to equal angles in each, then shall the other sides be equal, each to each, and also the third angle of the one equal to the third angle of the other.

PM, PN are squares on the sides of the right-angled triangle QPR, and MH, NK are perpendiculars on the hypotenuse QR produced. Prove that QR and the triangle PQR are respectively equal to the sum of MH, NK, and of the triangles QMH, RNK.

Second part of Proposition 26, Book I.



Construction.—Draw PL perpendicular to QR. (I. 12.)

Proof.—Angle HQM = angle QRP (I. 29); now, angles LPR, PRL = a right angle (I. 32), and, angles LPR, LPQ = a right angle (Hyp.), therefore angles LPR, LPQ = angles LPR; PRL (Ax. 1), wherefore angle LPQ = angle PRL. (Ax. 3.)

In the triangles PQL, QMH, angle PLQ = angle QHM (Ax. 11), angle LPQ = angle HQM (Ax. 1), and side PQ = side QM, being sides of a square, therefore QL = MH (I. 26), and LP = HQ, therefore triangle PQL = triangle QMH. (I. 4.)

Similarly it can be proved that RL = NK, and triangle PRL = triangle RNK.

Wherefore QR = MH + NK, and triangle PQR = triangles QMH, RNK. (Ax. 2.)

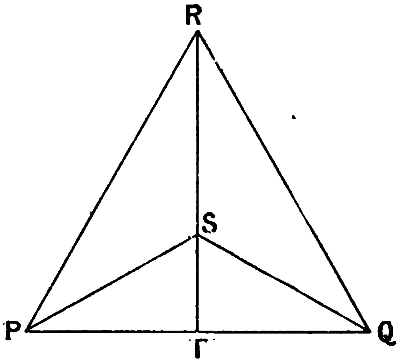
Q. E. D.

5. If a side of any triangle be produced, the exterior angle is equal to the two interior and opposite angles; and the three interior angles of every triangle are equal to two right angles.

If there be an isosceles and an equilateral triangle upon the same base, and so that the inner vertex is equally distant from the other vertex, and from the extremities of the base, then, according as that of the former is the inner or outer vertex, its base angle will be $\frac{1}{4}$ or $2\frac{1}{2}$ times the vertical.

Proposition 32, Book I.

(*a*) When the vertex of the isosceles triangle is within that of the equilateral triangle.



Let PQR be an equilateral triangle, and PQS an isosceles triangle having its vertex within that of the other.

Join RS, and produce it to meet PQ in T. (Posts. 1 and 2.)

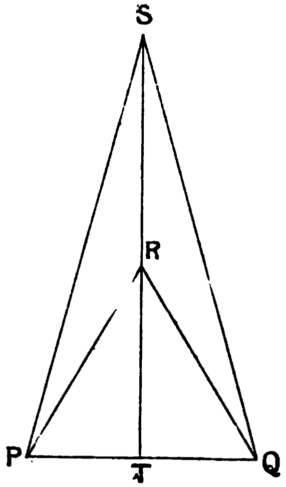
Proof.—RST bisects the angles at R and S and is at right angles to PQ.

Similarly, as SP, SQ, SR are equal, PS and QS bisect the angles at P and Q.

Angle PST = angles SPR, PRS (I. 32), = angle of equilateral triangle; and angle SPT = $\frac{1}{2}$ of angle of equilateral triangle, therefore angle SPT = $\frac{1}{2}$ angle PST = $\frac{1}{4}$ angle PSQ.

Q. E. D.

(*b*) When the vertex of the isosceles triangle is without that of the equilateral triangle.



Let the vertex of the isosceles triangle PQS fall without that of the equilateral triangle PQR.

Join SR, and produce it to meet PQ in T. (Posts. 1 and 2.)

Proof.—As before SRT bisects the angles at S and R, and is at right angles to PQ.

Angle PRT = angles RPS, PSR, (I. 32.)
= twice angle RPS or PSR, (I. 5.)

Therefore angle RPS or PSR = $\frac{1}{2}$ of angle PRT
= $\frac{1}{4}$ of angle PRQ
= $\frac{1}{4}$ of angle of equilateral triangle

Angle SPT = angle TPR + angle RPS
= angle of equilateral triangle + $\frac{1}{4}$ angle of equilateral triangle
= $\frac{5}{4}$ angle of equilateral triangle,

And angle PST = $\frac{1}{4}$ angle of equilateral triangle,

Therefore angle SPT = 5 times angle PST
= $2\frac{1}{2}$ times angle PSQ.

Q. E. D.

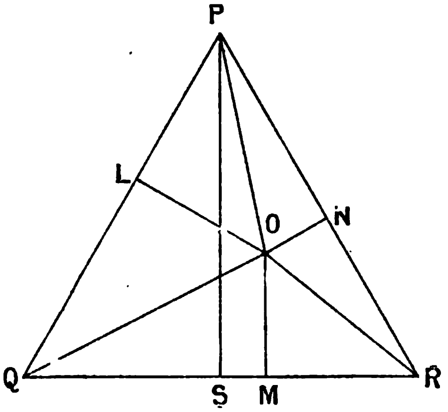
6. If a parallelogram and a triangle be on the same base and between the same parallels, the parallelogram is double of the triangle.

Hence deduce the area of a triangle when its base and altitude are given.

The three perpendiculars, let fall from any point within an equilateral triangle upon the sides, are together equal to the perpendicular from one of the angles upon the opposite side.

Proposition 41, Book I.

Area of rectangle = base × altitude,
„ triangle = $\frac{1}{2}$ area of rectangle, (I. 41.)
= $\frac{1}{2}$ (base × altitude).



Let PQR be an equilateral triangle, and let perpendiculars be drawn from a point O to the sides, viz., OM, ON, OL.

Draw PS perpendicular to QR.

Then OM + ON + OL = PS, or the perpendicular from one of the angles upon the opposite side.

Proof.—Area of triangle POQ = $\frac{1}{2}$ area of rectangle PQ, OL, (I. 41.)

Area of triangle QOR = $\frac{1}{2}$ area of rectangle QR, OM,

Area of triangle POR = $\frac{1}{2}$ area of rectangle RP, ON;

But sum of triangles POQ, QOR, POR = triangle PQR,

And PQ, QR, RP are equal;

Therefore area of triangle PQR = $\frac{1}{2}$ area of rectangle QR, (OL + OM + ON);

But area of triangle PQR = $\frac{1}{2}$ area of rectangle QR, PS,

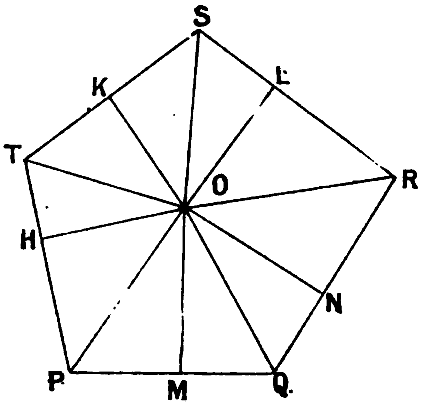
Wherefore OL + OM + ON = PS
= perpendicular from one of the angles upon the opposite side.

Q. E D.

7. If the square described on one of the sides of a triangle be equal to the squares described upon the other two sides of it; the angle contained by these two sides is a right angle.

From a point O perpendiculars OM, ON, OL, OK, OH are dropped on the sides PQ, QR, RS, ST, TP respectively, of the pentagon PQRST.

Show that the squares on MQ, NR, LS, KT, HP, are together equal to the squares on the alternate segments MP, HT, KS, LR, NQ. (Apply I. 47.)



Construction.—Join OP, OQ, OR, OS, OT. (Post 1.)

Proof.—Sq. on OQ = sq. on OM + sq. on MQ,
and also = sq. on ON + sq. on NQ;
Sq. on OR = sq. on ON + sq. on NR,
and also = sq. on OL + sq. on LR;
Sq. on OS = sq. on OL + sq. on LS,
and also = sq. on OK + sq. on KS;
Sq. on OT = sq. on OK + sq. on KT,
and also = sq. on OH + sq. on HT;
Sq. on OP = sq. on OH + sq. on HP,
and also = sq. on OM + sq. on MP;

Therefore, squares on OM, MQ, ON, NR, OL, LS, OK, KT, OH, HP
= squares on ON, NQ, OL, LR, OK, KS, OH, HT, OM, MP; (Ax. 2.)

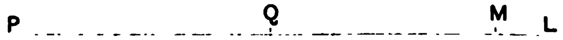
Wherefore, squares on MQ, NR, LS, KT, HP
= squares on MP, HT, KS, LR, NQ. (Ax. 3.)

Q. E. D.

8. If a straight line be divided into two equal parts, and also into two unequal parts, the rectangle contained by the unequal parts, together with the square on the line between the points of section, is equal to the square on half the line.

State and prove the corollary. (Proposition 5, Book II.)

Corollary.—From this proposition it is manifest that the difference of the squares on two unequal lines is equal to the rectangle contained by their sum and difference.



Let PQ, RS be the two lines, of which PQ is the greater.

Then the difference between the squares on PQ, RS shall be equal to the rectangle contained by the sum and difference of PQ, RS.

Construction.—Produce PQ to L (Post 2), making QL equal to PQ (I. 3), and from QL cut off QM equal to RS.

Proof.—The rect. PM, ML together with the sq. on QM = sq. on QL. (II. 5.)

But PM = sum of PQ, QM
= sum of PQ, RS; (Con.)

And ML = difference of QL, QM
= difference of PQ, RS; (Con.)

Therefore the rectangle contained by the sum and difference of PQ, RS, together with the square on RS, is equal to the square PQ;

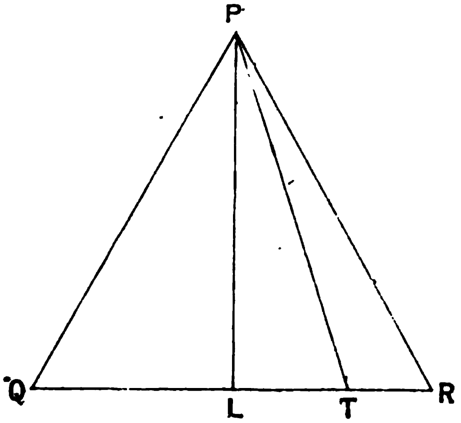
Wherefore the difference of the squares on PQ, RS is equal to the rectangle contained by their sum and difference. (Ax. 3.)

Q. E. D.

9. In every triangle, the square on the side subtending an acute angle is less than the squares on the sides containing that angle by twice the rectangle contained by either of these sides, and the straight line intercepted between the perpendicular let fall on it from the opposite angle and the acute angle.

T is a point in the side QR of an equilateral triangle PQR. Prove that the squares on QT, TR are together less than the square on PT by the rectangle contained by QT, TR.

Proposition 13, Book II.



Draw PL perpendicular to QR.

Proof.—Sq. on PT = sq. on PR + sq. on TR less twice rect. LR, TR
= sq. on QR + sq. on TR less rect. QR, TR
= sq. on QR + sq. on TR less (rect. QT, TR + sq. on TR) (II. 3.)
= sq. on QR less rect. QT, TR
= sq. on QT + sq. on TR + twice rect. QT, TR less rect. QT, TR (II. 4.)
= sq. on QT + sq. on TR + rect. QT, TR;

Therefore squares on QT, TR are together less than the square on PT by the rectangle contained by QT, TR.

Q. E. D.

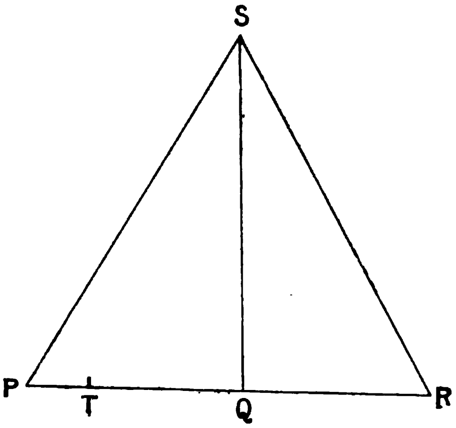
10. Divide algebraically a given line *a* into two parts, so that the squares of the whole and one part are together double of the square of the other part.

From your answer, deduce the construction for the corresponding geometrical problem, remembering that if the side of an equilateral triangle is represented by $2a$ linear units, the perpendicular from any one of its angles upon the side opposite will be represented by $a\sqrt{3}$.

ALGEBRAICAL SOLUTION.

Let x = one part,
Then, $a - x$ = other part;
$\therefore\ a^2 + x^2 = 2(a - x)^2$ (Hyp.)
$= 2(a^2 - 2ax + x^2)$
$= 2a^2 - 4ax + 2x^2$
$2x^2 - x^2 - 4ax = a^2 - 2a^2$
$x^2 - 4ax = -a^2$
$x^2 - 4ax + (2a)^2 = 4a^2 - a^2$
$= 3a^2$
$x - 2a = \pm a\sqrt{3}$
$\therefore\ x = 2a \pm a\sqrt{3}$.
Wherefore one part $= 2a - a\sqrt{3}$
or $a(2 - \sqrt{3})$,
and the other part $= a - (2a - a\sqrt{3})$
$= a - 2a + a\sqrt{3}$
$= a\sqrt{3} - a$
or $a(\sqrt{3} - 1.)$

GEOMETRICAL CONSTUCTION.



Let PQ represent a.

Produce PQ to R (Post. 2), making QR = PQ; (I. 3.)

Upon PR describe equilateral triangle PRS (I. 1), and join SQ (Post. 1).

$$\text{Then PR} = 2a,$$
$$\text{And SQ} = a\sqrt{3};$$
$$\text{From RP cut off RT} = \text{SQ};$$
$$\text{Then PT} = \text{PR} - \text{SQ}$$
$$= 2a - a\sqrt{3}$$
$$= \text{first required part of the line.}$$

Wherefore PQ is divided into two parts at the point T, so that the squares on PQ, PT are together double of the square on QT.

Q. E. F.

Male Candidates.

SECOND YEAR.

Euclid.

(*Three hours allowed for this Paper.*)

(Not more than EIGHT questions may be answered. Candidates are reminded that correct solutions of the deductions obtain high marks.)

N.B.—Capital letters (*excluding A, B, C, D, E, F*), not numbers, must be used in the diagrams.

The only signs allowed are + and =. The square on PQ may be written 'sq. on PQ,' and the rectangle contained by PQ, and RS, 'rect. PQ, RS.' Other abbreviations, if employed, must not be ambiguous.

1. To bisect a given rectilineal angle, that is, to divide it into two equal parts.

In the construction, why is the triangle described on the side *remote* from the apex of the given angle?

Proposition 9, Book I.

If the equilateral triangle were described on the *same* side, its vertex might coincide with the apex of the angle, and then the construction would fail. Or the vertex of the triangle might fall outside the angle, when the line joining the vertex and the angle would have to be produced in order to bisect the angle, and the proof would require modification. The restriction introduced insures that the vertex shall fall within the angle.

2. If a straight line fall on two parallel straight lines, it makes the alternate angles equal to one another, and the exterior angle equal to the interior and opposite angle on the same side; and also the two interior angles on the same side together equal to two right angles.

Enunciate the propositions of which this is the converse.

Proposition 29, Book I.

This is the converse of Propositions 27 and 28.

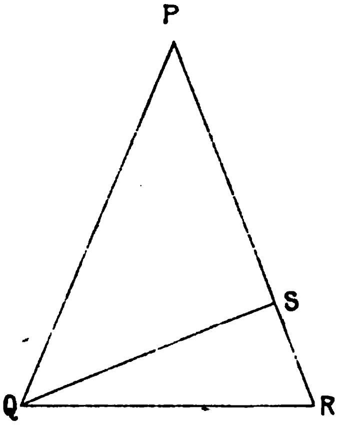
Prop. 27.—If a straight line falling on two other straight lines make the alternate angles equal to one another, the two straight lines shall be parallel to one another.

Prop. 28.—If a straight line falling on two other straight lines make the exterior angle equal to the interior and opposite angle on the same side of the line, or make the interior angles on the same side together equal to two right angles, the two straight lines shall be parallel to one another.

3. If a straight line be divided into any two parts, the square on the whole line is equal to the squares on the two parts, together with twice the rectangle contained by these parts.

If from one of the equal angles of an isosceles triangle a perpendicular be dropped on the opposite side, the square on that perpendicular is equal to the square on the line intercepted between it and the other equal angle, together with twice the rectangle contained by the segments of the side.

Proposition 4, Book II.



Let PQR be an isosceles triangle, and let QS be drawn perpendicular to PR from one of the equal angles.

Then the square on QS shall be equal to the square on SR, together with twice the rectangle PS, SR.

Proof.—Sq. on PQ = sq. on QS + sq. on PS, (I. 47.)
∴ Sq. on QS = sq. on PQ less sq. on PS (Ax. 3.)
= sq. on PS + sq. on SR + twice rect. PS, SR less sq. on PS (II. 4.)
= Sq. on SR + twice rect. PS, SR.

Q. E. D.

4. When is a straight line said to touch a circle?

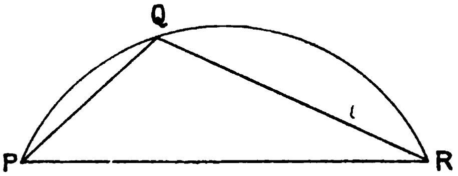
What is the distinction between the angle of a segment and the angle in a segment?

If any two points be taken in the circumference of a circle, the straight line which joins them shall fall within the circle.

A straight line is said to touch a circle when it meets the circle and being produced does not cut it.

The angle of a segment is that which is contained by the straight line which is the base of the segment and the arc.

An angle in a segment is the angle contained by two straight lines drawn from any point in the arc of the segment to the extremities of the straight line which is the base of the segment.



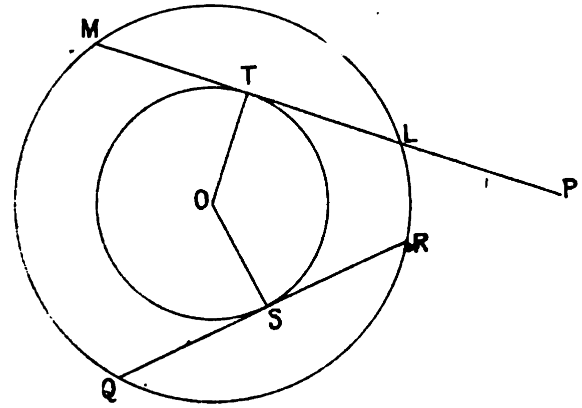
The angle formed by PR and the arc PQR is the angle of the segment, whereas the angle PQR is an angle in the segment.

Proposition 2, Book III.

5. To draw a straight line from a given point, either without or in the circumference, which shall touch a given circle.

Draw through a given point P without a given circle a straight line such that the part of it intercepted by the circle may be equal to a given chord of the circle.

Proposition 17, Book III.



Let P be the given point and QR the given chord.

Construction.—Find O the centre of the circle (III. 1), and draw OS perpendicular to QR (I. 11).

From the centre O at the distance OS describe a circle. (Post. 3.)

From P draw a tangent to this circle touching it at T (III. 17), and cutting the circle QRL at L and M.

Then PM shall be the line required.

Proof.—Because OT = OS,

And OT is perpendicular to ML (III. 18.)

„ OS „ „ SR (Con.)

Therefore ML = QR, (III. 14.)

Wherefore PM is the line required.

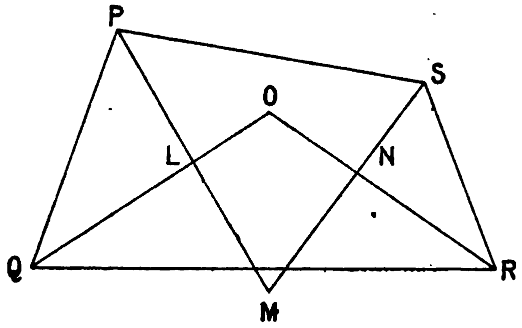
It is evident that the other tangent from P also fulfils the condition.

Q. E. F.

6. The opposite angles of any quadrilateral figure inscribed in a circle, are together equal to two right angles.

If through the angles of a quadrilateral, lines bisecting them be drawn, the points in which each line intersects the adjacent lines will lie on the circumference of a circle.

Proposition 22, Book III.



Let PQRS be a quadrilateral, and let its angles be bisected by the straight lines PM, QO, RO, SM, forming the quadrilateral LMNO.

Then the points L, M, N, O will lie on the circumference of a circle, that is, a circle can be described round the quadrilateral LMNO.

Proof.—Angle PLQ and half of angles at P and Q = Two right angles, (I. 32.)

And angle RNS and half of angles at R and S = Two right angles;

Therefore, angles PLQ, RNS, and half of angles at P, Q, R, S = Four right angles, (Ax. 2.)

And half of angles at P, Q, R, S = Two right angles (I. 32, Cor. 1.)

Wherefore, angles PLQ, RMS = Two right angles; (Ax. 3.)

But, angles OLM, OLN = Angles PLQ, RNS, (I. 15.)

Therefore, angles OLM, OLN are together equal to two right angles; (Ax. 1.)

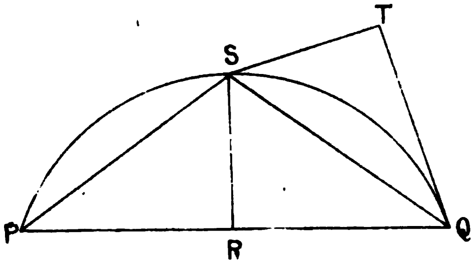
Wherefore a circle can be described round the quadrilateral LMNO. (Converse of III. 22.)

Q. E. D.

7. If a straight line touch a circle, and from the point of contact a straight line be drawn cutting the circle, the angles which this line makes with the line touching the circle shall be equal to the angles which are in the alternate segments of the circle.

Prove that the perpendicular drawn from the middle point of the arc of a circle upon the chord of the arc is equal to the perpendicular drawn from the same point upon the tangent at an extremity of the arc.

Proposition 32, Book III.



Let the chord PQ be bisected in R, and let RS be drawn at right angles to PQ, and ST perpendicular to the tangent at Q. Then SR shall be equal to ST.

Join SP, SQ.

Proof.—The triangles SRP, SRQ are equal in every respect. (I. 4.)

Angle SQT = Angle SPQ, (III. 32.)

= Angle SQR, (Ax. 1.)

And angle STQ = Angle SRQ, (Ax. 11.)

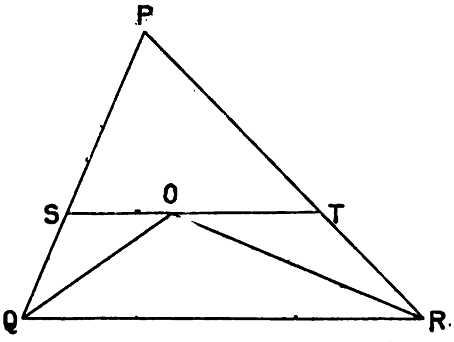
And side SQ is common to the two triangles SRQ, STQ, Therefore, SR = ST. (I. 26.)

Q. E. D.

8. To inscribe a circle in a given triangle.

If a new triangle be cut off by a line parallel to the base and passing through the centre of the inscribed circle, the perimeter of this triangle will be equal to the sum of the two sides of the first triangle.

Proposition 4, Book IV.



Let ST be drawn parallel to the base QR of the triangle PQR through the centre O of the inscribed circle.

Then the perimeter of the triangle PST shall be equal to the sum of PQ, PR.

Join OQ, OR.

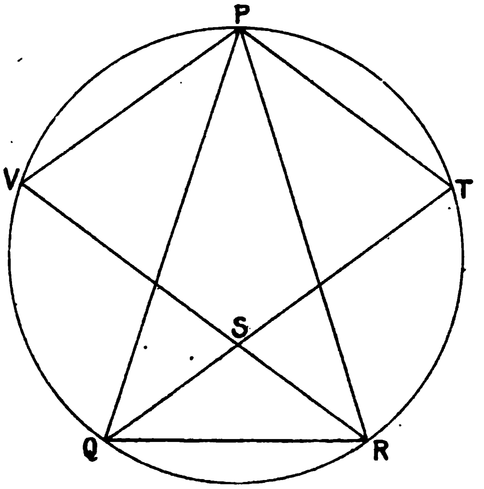
Proof.—Angle SOQ = Angle OQR, (I. 29.)
And angle SQO = Angle OQR, (Construction for inscribed circle)
Therefore, angle SOQ = Angle SQO, (Ax. 1.)
Wherefore, SO = SQ; (I. 6.)
Similarly it can be proved that TO = TR.
Therefore, perimeter of triangle PST = sum of sides PQ, PR.

Q. E. D.

9. What are the three main steps in the demonstration of Book IV., 10? (To describe an isosceles triangle, having each of the angles at the base double of the third angle.) PQR is such a triangle; the base angles are bisected by QST, RSV, which meet the circle described about the triangle at T, V respectively. Show that the figure PTSV is a rhombus.

The three main steps in the demonstration of IV. 10, are:—

(1) To prove that the base of the triangle touches the smaller circle.
(2) To prove that the lower triangle is isosceles.
(3) To prove that the third or upper triangle is isosceles.



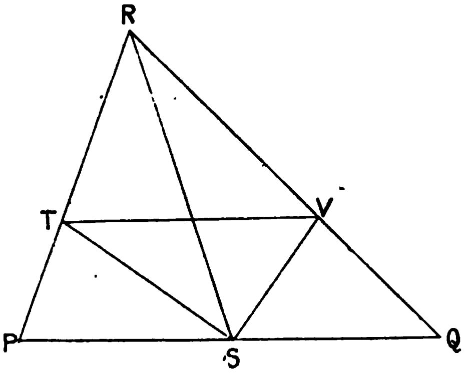
Proof.—Angle PRV = angle PQT, being halves of equal angles, (Hyp.)
Therefore, arc PV = arc PT, (III. 26.)
Wherefore, straight line PV = straight line PT. (III. 29.)
Again, angle VPQ = VRQ. (III. 21.)
Wherefore, angle VPQ = angle PQT,
And therefore PV is parallel to QT; (I. 27.)
Similarly it can be proved that PT is parallel to VR;
Therefore PTSV is a parallelogram, and its opposite sides are equal, that is, PV = ST, and PT = VS; (I. 34.)
But it has been proved that PV = PT;
Therefore PTSV is equilateral;
Wherefore PTSV is a rhombus.

Q. E. D.

10. If a straight line be drawn parallel to one of the sides of a triangle, it shall cut the other sides, or these produced, proportionally: and conversely, if the sides, or the sides produced, be cut proportionally, the straight line which joins the points of section shall be parallel to the remaining side of the triangle.

If the side PQ of the triangle PQR be bisected at S, and the angles RSP, RSQ be bisected by ST, SV, meeting PR, QR in T, V respectively, TV shall be parallel to PQ.

Proposition 2, Book VI.



Proof.—RT is to TP as RS is to SP, and RV is to VQ as RS is to SQ; (VI. 3.)
But SP = SQ; (Hyp.)
Therefore, RT is to TP as RV is to VQ,
Wherefore, TV is parallel to PQ. (VI. 2.)

Q. E. D.

11. Define similar rectilineal figures, reciprocal figures, proportion.

Equal parallelograms, which have one angle of the one equal to one angle of the other, have their sides about the equal angles reciprocally proportional: and conversely, parallelograms that have one angle of the one equal to one angle of the other, and their sides about the equal angles reciprocally proportional, are equal to one another.

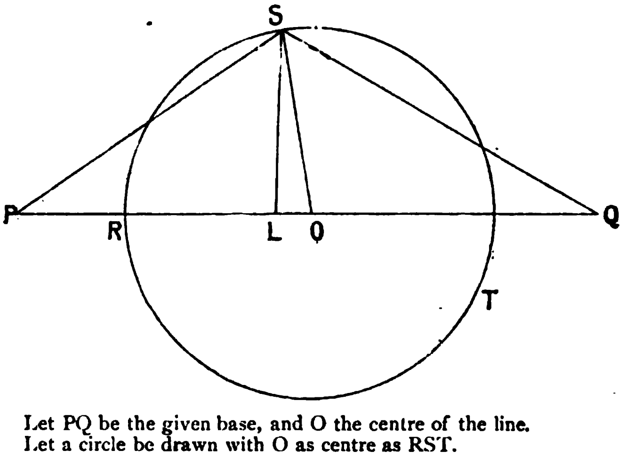
Similar rectilineal figures are those which have their several angles equal, each to each, and the sides about the equal angles proportionals.

Reciprocal figures, namely, triangles and parallelograms, are such as have their sides about two of their angles proportionals in such a manner, that a side of the first figure is to a side of the other, as the remaining side of this other is to the remaining side of the first.

Proportion.—The first of four magnitudes is said to have the same ratio to the second, that the third has to the fourth, when any equimultiples whatever of the first and the third being taken, and any equimultiples whatever of the second and the fourth, if the multiple of the first be less than that of the second, the multiple of the third is also less than that of the fourth, and if the multiple of the first be equal to that of the second, the multiple of the third is also equal to that of the fourth, and if the multiple of the first be greater than that of the second, the multiple of the third is also greater than that of the fourth.

Proposition 14, Book VI.

12. The base of a triangle is given, and its middle point is the centre of a fixed circle, on the circumference of which the vertex of the triangle lies: show that the sum of the squares on the two sides of the triangle is invariable.



Let PQ be the given base, and O the centre of the line.
Let a circle be drawn with O as centre as RST.

Then if straight lines be drawn to any point in the circumference of this circle from P and Q, the sum of the squares on these lines shall be invariable.

Take any point S, and join PS, QS, OS, and draw SL perpendicular to PQ. (I. 11.)

Proof.—Sq. on PS. = sq. on PO + sq. on OS less twice rect. PO, OL, (II. 13.)
And sq. on QS = sq. on QO + sq. on OS + twice rect. QO, OL; (II. 12.)
But, sq. on PO = sq. on QO,
And, rect. PO, OL = rect. QO, OL;
Therefore, sq. on PS + sq. on QS
= twice sq. on PO + twice square on OS
= twice sq. on half the base + twice square on the radius of the circle.

Wherefore the sum of the squares on the straight lines drawn to any point in the circumference is invariable, as it is always equal to twice the sum of the square on half the base and the square on the radius.

Q. E. D.

Male Candidates.

SECOND YEAR.

Algebra and Mensuration.

(*Three hours allowed for this paper.*)

Candidates are not permitted to answer more than NINE questions in Algebra and TWO in Mensuration.

The *solution* must be given at such length as to be intelligible to the Examiner, otherwise the answer will be considered of no value.

Algebra.

1. Show that $a^{\frac{1}{n}} \times b^{\frac{1}{n}} = (ab)^{\frac{1}{n}}$.

What does a^0 denote?

Find the square root of $(x + x^{-1}) - 2(x^{\frac{1}{2}} - x^{-\frac{1}{2}}) - 1$.

Let $a^{\frac{1}{n}} \times b^{\frac{1}{n}} = x$;

$$\begin{aligned} \therefore x^n &= \left(a^{\frac{1}{n}} \times b^{\frac{1}{n}}\right)^n \\ &= \left(a^{\frac{1}{n}}\right)^n \times \left(b^{\frac{1}{n}}\right)^n \\ &= a \times b \\ &= ab, \end{aligned}$$

$$\therefore x = (ab)^{\frac{1}{n}}.$$

Wherefore $a^{\frac{1}{n}} \times b^{\frac{1}{n}} = (ab)^{\frac{1}{n}}$.

$$\begin{aligned} a^n \times a^0 &= a^{n+0} = a^n, \\ \therefore a^0 &= \frac{a^n}{a^n} \\ &= 1. \end{aligned}$$

Square root of $(x + x^{-1}) - 2(x^{\frac{1}{2}} - x^{-\frac{1}{2}}) - 1$.

First Method.— $(x + x^{-1}) - 2(x^{\frac{1}{2}} - x^{-\frac{1}{2}}) - 1$

$$= x + \frac{1}{x} - 2x^{\frac{1}{2}} + \frac{2}{x^{\frac{1}{2}}} - 1$$

$$= x - 2x^{\frac{1}{2}} - 1 + \frac{2}{x^{\frac{1}{2}}} + \frac{1}{x}\Bigl(x^{\frac{1}{2}} - 1 - \frac{1}{x^{\frac{1}{2}}}$$

$$\begin{array}{r|l} & x \\ 2x^{\frac{1}{2}} - 1 & -2x^{\frac{1}{2}} - 1 \\ & -2x^{\frac{1}{2}} + 1 \\ \hline 2x^{\frac{1}{2}} - 2 - \frac{1}{x^{\frac{1}{2}}} & -2 + \frac{2}{x^{\frac{1}{2}}} + \frac{1}{x} \\ & -2 + \frac{2}{x^{\frac{1}{2}}} + \frac{1}{x} \\ \hline \end{array}$$

$$\therefore \text{Square root} = x^{\frac{1}{2}} - 1 - \frac{1}{x^{\frac{1}{2}}}$$

$$\text{or } \underline{x^{\frac{1}{2}} - x^{-\frac{1}{2}} - 1.}$$

Second Method.—$(x + x^{-1}) - 2(x^{\frac{1}{2}} - x^{-\frac{1}{2}}) - 1$

$$= x - 2x^{\frac{1}{2}} - 1 + 2x^{-\frac{1}{2}} + x^{-1}\,(x^{\frac{1}{2}} - 1 - x^{-\frac{1}{2}}$$

$$\begin{array}{r|l} & x \\ 2x^{\frac{1}{2}} - 1 & -2x^{\frac{1}{2}} - 1 \\ & -2x^{\frac{1}{2}} + 1 \\ \hline 2x^{\frac{1}{2}} - 2 - x^{-\frac{1}{2}} & -2 + 2x^{-\frac{1}{2}} + x^{-1} \\ & -2 + 2x^{-\frac{1}{2}} + x^{-1} \\ \hline \end{array}$$

$$\therefore \text{Square root} = x^{\frac{1}{2}} - 1 - x^{-\frac{1}{2}}$$

$$\text{or } \underline{x^{\frac{1}{2}} - x^{-\frac{1}{2}} - 1.}$$

2. Find the arithmetic, geometric, and harmonic means between a and b.

Given two fractions; show that two new fractions formed by taking as the numerators the arithmetic and geometric means of the original numerators, and taking as denominators the corresponding means of the original denominators, are each intermediate in value between the original fractions.

Let A denote the arithmetic mean, G the geometric mean, and H the harmonic mean.

Then,

$$\begin{aligned} A - a &= b - A, \\ 2A &= a + b, \\ \therefore A &= \tfrac{1}{2}(a + b). \\ \frac{G}{a} &= \frac{b}{G} \\ G^2 &= ab \\ \therefore G &= \sqrt{ab}. \\ \frac{1}{H} - \frac{1}{a} &= \frac{1}{b} - \frac{1}{H} \\ \frac{1}{H} + \frac{1}{H} &= \frac{1}{a} + \frac{1}{b} \\ \frac{2}{H} &= \frac{a + b}{ab} \\ \frac{H}{2} &= \frac{ab}{a + b} \\ \therefore H &= \frac{2ab}{a + b}. \end{aligned}$$

Let $\frac{a}{b}$ and $\frac{c}{d}$ represent the two fractions, of which $\frac{a}{b}$ is the greater.

Then the two new fractions are

$$\frac{\frac{1}{2}(a + c)}{\frac{1}{2}(b + d)} \text{ and } \frac{\sqrt{ac}}{\sqrt{bd}}$$

$$\text{or } \frac{a + c}{b + d} \text{ and } \sqrt{\frac{ac}{bd}}.$$

$$\begin{array}{c|c} \frac{a}{b} > \frac{c}{d} & \frac{a}{b} > \frac{c}{d} \\ \frac{a}{c} > \frac{b}{d} & \frac{d}{b} > \frac{c}{a} \\ \frac{a}{c} + 1 > \frac{b}{d} + 1 & \frac{d}{b} + 1 > \frac{c}{a} + 1 \\ \frac{a + c}{c} > \frac{b + d}{d} & \frac{b + d}{b} > \frac{a + c}{a} \\ \therefore \underline{\frac{a + c}{b + d} > \frac{c}{d}} & \therefore \underline{\frac{a}{b} > \frac{a + c}{b + d}} \end{array}$$

Again,

$$\begin{array}{c|c} \frac{a}{b} > \frac{c}{d} & \frac{a}{b} > \frac{c}{d} \\ \frac{a}{b} \times \frac{c}{d} > \frac{c}{d} \times \frac{c}{d} & \frac{a}{b} \times \frac{a}{b} > \frac{c}{d} \times \frac{a}{b} \\ \frac{ac}{bd} > \frac{c^2}{d^2} & \frac{a^2}{b^2} > \frac{ac}{bd} \\ \therefore \underline{\sqrt{\frac{ac}{bd}} > \frac{c}{d}} & \therefore \underline{\frac{a}{b} > \sqrt{\frac{ac}{bd}}} \end{array}$$

$\therefore \frac{a + c}{b + d}$ and $\sqrt{\frac{ac}{bd}}$ are each intermediate in value between $\frac{a}{b}$ and $\frac{c}{d}$.

3. Simplify:—

(1) $\dfrac{x^4 + 1 + (x + 1)^4}{[x^2 + 1 + (x + 1)^2]^2}$

(2) $\dfrac{e^{x-y} + xy^{-1} + yx^{-1} + e^{y-x}}{xy^{-1}e^{x-y} + 2 + yx^{-1}e^{y-x}}$.

$$\begin{aligned} (1)\ & \frac{x^4 + 1 + (x + 1)^4}{[x^2 + 1 + (x + 1)^2]^2} \\ &= \frac{x^4 + 1 + x^4 + 4x^3 + 6x^2 + 4x + 1}{(x^2 + 1 + x^2 + 2x + 1)^2} \\ &= \frac{2x^4 + 4x^3 + 6x^2 + 4x + 2}{(2x^2 + 2x + 2)^2} \\ &= \frac{2(x^4 + 2x^3 + 3x^2 + 2x + 1)}{4(x^2 + x + 1)^2} \\ &= \frac{(x^2 + x + 1)^2}{2(x^2 + x + 1)^2} \\ &= \underline{\tfrac{1}{2}}.\quad \text{Ans.} \end{aligned}$$

$$(2)\ \frac{e^{x-y}+xy^{-1}+yx^{-1}+e^{y-x}}{xy^{-1}e^{x-y}+2+yx^{-1}e^{y-x}}$$

$$=\frac{xy^{-1}+e^{x-y}+e^{y-x}+x^{-1}y}{\left(x^{\frac{1}{2}}y^{-\frac{1}{2}}e^{\frac{x-y}{2}}+x^{-\frac{1}{2}}y^{\frac{1}{2}}e^{\frac{x-y}{2}}\right)^2}$$

$$=\frac{\left(x^{\frac{1}{2}}y^{-\frac{1}{2}}e^{\frac{x-y}{2}}+x^{-\frac{1}{2}}y^{\frac{1}{2}}e^{\frac{y-x}{2}}\right)\left(x^{\frac{1}{2}}y^{-\frac{1}{2}}e^{\frac{y-x}{2}}+x^{-\frac{1}{2}}y^{\frac{1}{2}}e^{\frac{x-y}{2}}\right)}{\left(x^{\frac{1}{2}}y^{-\frac{1}{2}}e^{\frac{x-y}{2}}+x^{-\frac{1}{2}}y^{\frac{1}{2}}e^{\frac{y-x}{2}}\right)^2}$$

$$=\frac{x^{\frac{1}{2}}y^{-\frac{1}{2}}e^{\frac{y-x}{2}}+x^{-\frac{1}{2}}y^{\frac{1}{2}}e^{\frac{x-y}{2}}}{x^{\frac{1}{2}}y^{-\frac{1}{2}}.e^{\frac{x-y}{2}}+x^{-\frac{1}{2}}y^{\frac{1}{2}}e^{\frac{y-x}{2}}}$$

Multiplying by $\left.x^{\frac{1}{2}}y^{\frac{1}{2}}e^{\frac{x-y}{2}}\right\}=\dfrac{x+ye^{x-y}}{xe^{x-y}+y}$.

$=\dfrac{x+ye^{x-y}}{y+xe^{x-y}}$. Ans.

4. Find the number of permutations of n things taken r together.

How many different words may be made of the letters of the expression $a^2\,e^3\,b^4\,c$?

Suppose there are n letters $a, b, c, d, \ldots\ldots$; put a before each of the other letters, and we thus obtain $(n-1)$ permutations in which a stands first. Next put b before each of the other letters, and we obtain $(n-1)$ permutations in which b stands first.

Similarly there are $(n-1)$ permutations in which c stands first; and so on. Thus, on the whole, there are $n\,(n-1)$ permutations of n letters taken two at a time.

Out of n letters we can form $n\,(n-1)$ permutations each of two letters; hence out of the $n-1$ letters $b, c, d, \ldots\ldots$ we can form $(n-1)\ (n-2)$ permutations each of two letters; put a before each of these, and we have $(n-1)\ (n-2)$ permutations each of three letters in which a stands first.

Similarly there are $(n-1)\ (n-2)$ permutations each of three letters in which b stands first. Similarly there are as many in which c stands first; and so on.

Thus, on the whole, there are $n\,(n-1)\ (n-2)$ permutations of n letters taken three at a time.

From these cases it might be *conjectured* that the number of permutations of n letters taken r at a time is

$$n\,(n-1)\,(n-2)\ldots\ldots(n-r+1),$$

and this is the case.

For, suppose it is true that the number of permutations of n letters taken $r-1$ at a time is

$$n\,(n-1)\,(n-2)\ldots\ldots[n-(r-1)+1],$$

it can be shown that a similar formula will give the number of the permutations of the letters taken r at a time.

For out of the $n-1$ letters $b, c, d, \ldots\ldots$

$$(n-1)\ (n-2)\ldots\ldots[n-1-(r-1)+1]$$

permutations each of $r-1$ letters can be formed; put a before each of these, and we obtain as many permutations each of r letters in which a stands first.

Similarly we have as many in which b stands first, as many in which c stands first, and so on.

Thus, on the whole, there are

$$n\,(n-1)\,(n-2)\ldots\ldots(n-r+1)$$

permutations of n letters taken r at a time,

If then the formula holds when the letters are taken $r-1$ at a time, it will hold when they are taken r at a time.

It has been proved to hold when they are taken three at a time, therefore it holds when they are taken four at a time, therefore it holds when they are taken five at a time, and so on.

Thus it holds universally.

In the expression $a^2\,e^3\,b^4\,c$, the letter a occurs twice, e three times, b four times, and c once, and number of letters = 10.

$$\therefore \text{ No. of words} = \frac{\underline{|10}}{\underline{|2}\ \underline{|3}\ \underline{|4}}$$

$$=\frac{10\cdot 9\cdot \overset{4}{\cancel{8}}\cdot 7\cdot \cancel{6}\cdot 5}{\cancel{2}\cdot\cancel{2}\cdot 3}$$

$$= 12{,}600.\ \text{Ans.}$$

5. Investigate a method for extracting the square root of a binomial surd, one of whose terms is rational, the other a quadratic surd.

Prove that in the equation $x^2 - x = 2 + \sqrt{5}$, one root is the square of the other.

Let $a+\sqrt{b}$ be the given binomial, and suppose

$$\sqrt{a+\sqrt{b}}=\sqrt{x}+\sqrt{y},$$

Then, $\sqrt{a-\sqrt{b}}=\sqrt{x}-\sqrt{y}$;

By multiplication, $\sqrt{a^2-b}=x-y$;

By squaring both sides of the first equation,

$$a+\sqrt{b}=x+2\sqrt{xy}+y,$$

$$\therefore\ a=x+y;$$

Hence, by addition and subtraction,

$$a+\sqrt{a^2-b}=2x, \text{ and } a-\sqrt{a^2-b}=2y,$$

$$\left.\begin{aligned}\therefore\ x&=\tfrac{1}{2}\left(a+\sqrt{a^2-b}\right)\\ y&=\tfrac{1}{2}\left(a-\sqrt{a^2-b}\right)\end{aligned}\right\}$$

Thus x and y are known, and therefore $\sqrt{a+\sqrt{b}}$, which is $\sqrt{x}+\sqrt{y}$, is known.

Also $\sqrt{a-\sqrt{b}}$ is known, for it is $\sqrt{x}-\sqrt{y}$.

$$x^2-x=2+\sqrt{5}$$

$$x^2-x-(2+\sqrt{5})=0$$

$$\therefore\ \text{Roots are } \frac{1+\sqrt{1+4(2+\sqrt{5})}}{2} \text{ and } \frac{1-\sqrt{1+4(2+\sqrt{5})}}{2}$$

$$=\frac{1+\sqrt{9+4\sqrt{5}}}{2} \text{ and } \frac{1-\sqrt{9+4\sqrt{5}}}{2};$$

Let $\sqrt{9+4\sqrt{5}}=\sqrt{x}+\sqrt{y}$,

Then, $\sqrt{9-4\sqrt{5}}=\sqrt{x}-\sqrt{y}$,

$$\begin{aligned}\therefore\ 81-16\times 5&=x-y\\ 1&=x-y;\\ 9+4\sqrt{5}&=x+y+2\sqrt{xy}\\ \therefore\ 9&=x+y;\\ 2x&=10 \text{ and } 2y=8\\ \therefore\ x&=5 \text{ and } y=4.\\ \therefore\ \sqrt{9+4\sqrt{5}}&=\sqrt{5}+\sqrt{4}\\ &=\sqrt{5}+2\end{aligned}$$

$$\text{Wherefore Roots}=\frac{1+\sqrt{5}+2}{2} \text{ and } \frac{1-(\sqrt{5}+2)}{2}$$

$$=\frac{3+\sqrt{5}}{2} \text{ and } \frac{-1-\sqrt{5}}{2};$$

$$\text{Now, } \left(\frac{-1-\sqrt{5}}{2}\right)^2=\frac{1+2\sqrt{5}+5}{4}$$

$$=\frac{6+2\sqrt{5}}{4}$$

$$=\frac{3+\sqrt{5}}{2};$$

$\therefore$ One root is the square of the other.

6. In the expansion of $(1+x)^n$, the coefficients of terms, equally distant from the beginning and end, are the same, when the index is a positive integer.

Show that in the same expansion, the sum of the even coefficients is equal to the sum of the odd coefficients.

In the expansion of $(1+x)^n$, the coefficient of the rth term from the beginning

$$=\frac{n\,(n-1)\,(n-2)\ldots(n-r+2)}{\underline{|r-1}};$$

Multiplying numerator and denominator by $\underline{|n-r+1}$ this becomes $\dfrac{\underline{|n}}{\underline{|r-1}\ \underline{|n-r+1}}$.

The *r*th term from the end is the $(n - r + 2)$th term from the beginning, and its coefficient is

$$\frac{n(n-1)\dots[n-(n-r+2)+2]}{\underline{|n-r+1}}$$

$$= \frac{n(n-1)\dots r}{\underline{|n-r+1}};$$

Multiplying numerator and denominator by $\underline{|r-1}$ this becomes

$$\frac{\underline{|n}}{\underline{|r-1}\;\underline{|n-r+1}}.$$

∴ Coefficients of terms, equally distant from the beginning and end, are the same.

In the expansion of $(1 + x)^n$, put $x = -1$; then

$$0 = 1 - n + \frac{n(n-1)}{1.2} - \frac{n(n-1)(n-2)}{1.2.3} + \dots$$

$$= \text{sum of odd coefficients} - \text{sum of even coefficients};$$

∴ Sum of even coefficients = sum of odd coefficients.

7. Show that the logarithm of a number to the base *b* may be found by multiplying the logarithm of the given number to the base *a* by $\log_b a$.

Given $\log 2 = {\cdot}30103$, find $\log 5$, $\log {\cdot}016$, $\log 1\frac{3}{5}$, $\log 15\frac{5}{8}$.

$$\left.\begin{aligned} \text{Let } x &= \log_a n \\ y &= \log_b n \end{aligned}\right\}$$

$$\begin{aligned} \therefore n &= a^x \text{ and } = b^y, \\ a^x &= b^y \\ a &= b^{\frac{y}{x}} \\ \frac{y}{x} &= \log_b a \\ \therefore y &= x \log_b a; \end{aligned}$$

Hence the logarithm of a number to the base *b* may be found by multiplying the logarithm of the given number to the base *a* by $\log_b a$.

$$\begin{aligned} \text{Log } 5 &= \log \tfrac{10}{2} \\ &= \log 10 - \log 2 \\ &= 1 - {\cdot}30103 \\ &= \underline{{\cdot}69897.} \end{aligned}$$

$$\begin{aligned} \text{Log } {\cdot}016 &= \log \tfrac{16}{1000} \\ &= \log 16 - \log 1000 \\ &= \log 2^4 - 3 \\ &= 4 \log 2 - 3 \\ &= ({\cdot}30103 \times 4) - 3 \\ &= 1{\cdot}20412 - 3 \\ &= -1{\cdot}79588 \\ \text{or } &\underline{\overline{2}{\cdot}20412.} \end{aligned}$$

$$\begin{aligned} \text{Log } 1\tfrac{3}{5} &= \log 1{\cdot}6 \\ &= \log \tfrac{16}{10} \\ &= \log 16 - \log 10 \\ &= 1{\cdot}20412 - 1 \\ &= \underline{{\cdot}20412.} \end{aligned}$$

$$\begin{aligned} \text{Or, Log } 1\tfrac{3}{5} &= \log 1{\cdot}6 \\ &= \log ({\cdot}016 \times 100) \\ &= \log {\cdot}016 + \log 100 \\ &= \overline{2}{\cdot}20412 + 2 \\ &= \underline{{\cdot}20412.} \end{aligned}$$

$$\begin{aligned} \text{Log } 15\tfrac{5}{8} &= \log \tfrac{125}{8} \\ &= \log 125 - \log 8 \\ &= \log 5^3 - \log 2^3 \\ &= 3 \log 5 - 3 \log 2 \\ &= ({\cdot}69897 - {\cdot}30103) \times 3 \\ &= {\cdot}39794 \times 3 \\ &= \underline{1{\cdot}19382.} \end{aligned}$$

$$\begin{aligned} \text{Or, Log } 15\tfrac{5}{8} &= \log \tfrac{125}{8} \\ &= \log \tfrac{1000}{64} \\ &= \log 1000 - \log 64 \\ &= 3 - \log 2^6 \\ &= 3 - ({\cdot}30103 \times 6) \\ &= 3 - 1{\cdot}80618 \\ &= \underline{1{\cdot}19382.} \end{aligned}$$

8. Find the amount of an annuity left unpaid for any number of years, allowing simple interest upon each sum from the time it becomes due.

A sum of £P is left to A and B so that at the end of *a* and *b* years (when they will respectively be of age) their shares put out at compound interest at *r* per cent. per annum will be equal. Find how much is left to each of them.

Let A be the annuity, *n* the number of years, *r* the interest of one pound in one year, and M the amount.

At the end of the first year A becomes due, and at the end of the second year the interest of the first annuity is *r*A; at the end of this year the principal becomes 2A, therefore the interest due at the end of the third year is 2*r* A; in the same way the interest due at the end of the fourth year is 3*r* A, and so on; hence the whole interest is

$$rA + 2rA + 3rA + \dots\dots + (n-1)\,rA$$

$$\text{that is, } rA\,(1 + 2 + 3 + \dots\dots + n - 1)$$

$$= \frac{n(n-1)}{2}\,rA;$$

and the sum of the annuities is *n*A;

$$\therefore M = nA + \frac{n(n-1)}{2}\,rA.$$

Let x = sum in pounds left to A,

Then $P - x$ = ,, ,, B;

∴ Amount of A's principal at compound interest

$$= x(1+r)^a,$$

Amount of B's principal at compound interest

$$= (P - x)(1+r)^b;$$

$$\begin{aligned} \therefore x(1+r)^a &= (P-x)(1+r)^b \\ &= P(1+r)^b - x(1+r)^b \\ x(1+r)^a + x(1+r)^b &= P(1+r)^b \\ x[(1+r)^a + (1+r)^b] &= P(1+r)^b \\ \therefore x &= \frac{P(1+r)^b}{(1+r)^a + (1+r)^b}. \\ P - x &= P - \frac{P(1+r)^b}{(1+r)^a + (1+r)^b} \\ &= \frac{P(1+r)^a}{(1+r)^a + (1+r)^b}. \end{aligned}$$

$$\therefore \text{Sum left to A} = £\frac{P(1+r)^b}{(1+r)^a + (1+r)^b},$$

$$,, \quad \text{B} = £\frac{P(1+r)^a}{(1+r)^a + (1+r)^b};$$

or, Sum left to A = amount of £P for *b* years divided by the sum of the amounts of £1 for *a* years and *b* years,

And, Sum left to B = amount of £P for *a* years divided by the same divisor.

9. Solve the equations :—

$$(1)\quad x^4 + 5 - 2\sqrt{x^2 - 2} = 5x^2$$

$$(2)\quad \begin{cases} 2x^2 + 3y^2 - xy = 31 \\ x - y = 3 \end{cases}$$

$$(1)\quad x^4 + 5 - 2\sqrt{x^2-2} = 5x^2$$

$$x^4 - 4x^2 + 4 = x^2 + 2\sqrt{x^2 - 2} - 1$$

$$(x^2 - 2)^2 = (x^2 - 2) + 2\sqrt{x^2 - 2} + 1$$

Extracting square root of each side } $x^2 - 2 = \sqrt{x^2 - 2} + 1$

$$(x^2 - 2) - \sqrt{x^2 - 2} = 1$$

Completing the square } $(x^2 - 2) - \sqrt{x^2 - 2} + (\frac{1}{2})^2 = 1 + \frac{1}{4}$

$$= \frac{5}{4}$$

Extracting square root } $\sqrt{x^2 - 2} - \frac{1}{2} = \frac{\pm\sqrt{5}}{2}$

$$\sqrt{x^2 - 2} = \frac{\pm\sqrt{5} + 1}{2}$$

Squaring each side } $x^2 - 2 = \frac{5 \pm 2\sqrt{5} + 1}{4}$

$$= \frac{3 \pm \sqrt{5}}{2}$$

$$x^2 = \frac{7 \pm \sqrt{5}}{2}$$

$$\therefore x = \pm\sqrt{\tfrac{1}{2}(7 \pm \sqrt{5})}.$$

Another method from

$$x^2 - 2 = \sqrt{x^2 - 2} + 1$$

$$x^2 - 3 = \sqrt{x^2 - 2}$$

Squaring each side $\}$ $x^4 - 6x^2 + 9 = x^2 - 2$

$$x^4 - 7x^2 = -11$$

$$x^4 - 7x^2 + (\tfrac{7}{2})^2 = \tfrac{49}{4} - 11$$

$$= \tfrac{5}{4}$$

$$x^2 - \tfrac{7}{2} = \frac{\pm\sqrt{5}}{2}$$

$$x^2 = \frac{7 \pm \sqrt{5}}{2}$$

$$\therefore\ x = \pm\sqrt{\tfrac{1}{2}(7 \pm \sqrt{5})}.$$

(2)

$$\left.\begin{array}{ll}(1) & 2x^2 + 3y^2 - xy = 31 \\ (2) & x - y = 3\end{array}\right\}$$

From (2)] $y = x - 3.$

$$(1)\ 2x^2 + 3(x-3)^2 - x(x-3) = 31$$

$$2x^2 + 3(x^2 - 6x + 9) - x^2 + 3x = 31$$

$$x^2 + 3x + 3x^2 - 18x + 27 = 31$$

$$4x^2 - 15x = 4$$

$$x^2 - \frac{15x}{4} = 1$$

$$x^2 - \frac{15x}{4} + (\tfrac{15}{8})^2 = 1 + \tfrac{225}{64}$$

$$= \frac{64 + 225}{64}$$

$$= \tfrac{289}{64}$$

$$x - \tfrac{15}{8} = \pm\tfrac{17}{8}$$

$$x = \pm\tfrac{17}{8} + \tfrac{15}{8}$$

$$\therefore\ x = 4, \text{ or } -\tfrac{1}{4}.$$

And $y = x - 3$

$$= 4 - 3, \text{ or } -\tfrac{1}{4} - 3$$

$$= 1, \text{ or } -\tfrac{13}{4}.$$

$$\therefore\ \left.\begin{array}{l} x = 4, \text{ or } -\tfrac{1}{4} \\ \underline{y = 1, \text{ or } -\tfrac{13}{4}} \end{array}\right\} \text{ Ans.}$$

10. A man bought a number of £100 railway shares when they were at a certain rate per cent. discount for £900, and afterwards when they were at the same rate per cent. premium sold all but one of them for £990. How many were they, and what did each cost?

Let x = rate per cent. discount and premium,
Then, $100 - x$ = price in pounds when bought,
And, $100 + x$ = ,, ,, ,, sold;

$$\therefore\ \frac{900}{100 - x} = \frac{990}{100 + x} + 1$$

$$900(100 + x) = 990(100 - x) + (100 + x)(100 - x)$$

$$90{,}000 + 900x = 99{,}000 - 990x + 10{,}000 - x^2$$

$$x^2 + 1890x = 19{,}000$$

$$x^2 + 1890x + (945)^2 = 19{,}000 + 893{,}025$$

$$= 912{,}025$$

$$x + 945 = \pm 955$$

$$x = \pm 955 - 945$$

$$\therefore\ x = 10, \text{ or } -1{,}900.$$

The minus sign is inapplicable.

∴ Price of each share = £100 − £10
= £90;
Number of shares = £900 ÷ £90
= 10.

11. A merchant starts in business with £4,000 capital. In the first year he makes a certain percentage of profit, from which he takes £300 for expenses, and adds the rest to his capital. Next year he makes the same percentage of profit, and having again spent £300, finds he has £5,100 left in the business. What percentage of profit did he make?

Let x = Percentage of profit;

Then, $\left[4000\left(1 + \frac{x}{100}\right) - 300\right]\left(1 + \frac{x}{100}\right) - 300$

$$= 5100$$

$$(4000 + 40x - 300)\left(1 + \frac{x}{100}\right) = 5100 + 300$$

$$(3700 + 40x)\left(1 + \frac{x}{100}\right) = 5400$$

$$3700 + 37x + 40x + \frac{2x^2}{5} = 5400$$

$$\frac{2x^2}{5} + 77x = 5400 - 3700$$

$$= 1700$$

$$x^2 + 77x \times \tfrac{5}{2} = 1700 \times \tfrac{5}{2}$$

$$x^2 + \frac{385x}{2} = 4250$$

$$x^2 + \frac{385x}{2} + (\tfrac{385}{4})^2 = 4250 + \tfrac{148225}{16}$$

$$= \frac{68000 + 148225}{16}$$

$$= \tfrac{216225}{16}$$

$$x + \tfrac{385}{4} = \pm\tfrac{465}{4}$$

$$x = \pm\tfrac{465}{4} - \tfrac{385}{4}$$

$$\therefore\ x = 20, \text{ or } -\tfrac{425}{2}.$$

The minus sign is inapplicable.

∴ Percentage of profit = 20.

Mensuration.

$(\pi = 3\tfrac{1}{7}.)$

1. Find the edges of a cube whose solidity is equal to that of a rectanglar parallelopiped whose edges are 9 ft. 4 in., 21 ft. 4 in., 32 ft. 8 in.

$$\text{Length of edge} = \sqrt[3]{9\tfrac{1}{3}\text{ ft.} \times 21\tfrac{1}{3}\text{ ft.} \times 32\tfrac{2}{3}\text{ ft.}}$$

$$= \tfrac{1}{3}\sqrt{28 \times 64 \times 98}\text{ ft.}$$

$$= \tfrac{1}{3}\sqrt[3]{7 \times 4 \times 64 \times 49 \times 2}\text{ ft.}$$

$$= \tfrac{1}{3}(7 \times 2 \times 4)\text{ ft.}$$

$$= \tfrac{56}{3}\text{ ft.}$$

$$= \underline{18\text{ ft. }8\text{ in.}}\text{ Ans.}$$

2. Find the cost of gilding the surface of a cone whose altitude is 12 feet and the diameter of its base is 10 feet, at ¼d. per sq. in., including the base.

$$\text{Slant height} = \sqrt{12^2 + 5^2}\text{ ft.}$$

$$= \sqrt{144 + 25}\text{ ft.}$$

$$= \sqrt{169}\text{ ft.}$$

$$= 13\text{ ft.}$$

Area of surface of cone

= ½ (perimeter of base × slant height) + area of base

$$= [\tfrac{1}{2}(10 \times 3\tfrac{1}{7} \times 13) + (5^2 \times 3\tfrac{1}{7})]\text{ sq. ft.}$$

$$= [(65 + 25) \times 3\tfrac{1}{7}]\text{ sq. ft.}$$

$$= (90 \times 3\tfrac{1}{7})\text{ sq. ft.}$$

$$\text{Cost of gilding} = (90 \times 3\tfrac{1}{7} \times 3)\text{s.}$$

$$= £\frac{9 \times 11 \times 3}{7}$$

$$= £\tfrac{297}{7}$$

$$= \underline{£42\ 8\text{s. }6\tfrac{6}{7}\text{d.}}\text{ Ans.}$$

3. Find the weight of a spherical shell whose diameter is 17 inches, the thickness of the metal being $1\frac{1}{8}$ inches and a cubic inch of it weighing $\frac{1}{4}$ lb.

$$\begin{aligned}\text{Solidity of shell} &= \tfrac{4}{3}\pi\left[\left(\tfrac{17}{2}\right)^3 - \left(\tfrac{17}{2} - \tfrac{9}{8}\right)^3\right] \text{ cub. in.}\\ &= \tfrac{4}{3} \times \tfrac{22}{7}\left[\tfrac{4913}{8} - \left(\tfrac{59}{8}\right)^3\right] \text{ cub. in.}\\ &= \tfrac{11}{21}\left[4913 - \tfrac{205379}{64}\right] \text{ cub. in.}\\ &= \tfrac{11}{21}\left[\frac{314432 - 205379}{64}\right] \text{ cub. in.}\\ &= \frac{11 \times \overset{5193}{\cancel{109053}}}{\cancel{21} \times 64} \text{ cub. in.};\\ \text{Weight of shell} &= \frac{11 \times 5193}{64 \times 4} \text{ lbs.}\\ &= \tfrac{57123}{256} \text{ lbs.}\\ &= 223\tfrac{35}{256} \text{ lbs.}\\ &= 1 \text{ cwt. } 3 \text{ qrs. } 27\tfrac{35}{256} \text{ lbs.}\\ &\text{or } \underline{2 \text{ cwt. nearly.}} \quad \text{Ans.}\end{aligned}$$

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Quarterly Arithmetical Tests.

STANDARD I.—FIRST QUARTER.

1.
8
43
2
570
19

2.
596
34

3.
827
801

4. 6 × 2; 3 × 3; 2 × 4.

SECOND QUARTER.

1.
26
305
7
593
80

2.
460
219

3.
348
76

4. 9 × 3; 8 × 4; 11 × 5.

THIRD QUARTER.

1.
159
430
672
908
763

2.
702
695

3.
400
7

4. 9 × 4; 12 × 5; 7 × 6.

STANDARD II.—FIRST QUARTER.

1. 95 + 4,070 + 6 + 30,819 + 503 + 7,628.

2. From 43,001 take 39,968.

3. 67,049 × 59.

4. 12 × 8; 11 × 10; 9 × 12.

SECOND QUARTER.

1. 83,564 × 708.

2. 30,402 ÷ 6. Write the answer in words.

3. There are 30 boys in a class. If each have four sums to do, and they get only 98 right, how many are wrong?

4. 47d.; 63d.; 76d.

THIRD QUARTER.

1. 56,506 ÷ 12.

2. 96,478 × 650.

3. If there are 49 rows of trees in an orchard, and 156 trees in a row, how many trees are there in the orchard?

4. 94d.; 103d.; 140d.

STANDARD III.—FIRST QUARTER.

1. 43,810 ÷ 26.

2. How often is eighty-seven contained in seven hundred thousand two hundred and sixty-three?

3. Divide half a million by 694.

4. In a division sum the divisor is 470, the quotient 5,609, and the remainder 370. What is the dividend?

SECOND QUARTER.

1. From sixty-five pounds take thirty-nine pounds twelve shillings and seven pence farthing.

2. What is the sum of seven pounds fourteen shillings and ten pence, fifteen shillings and eight pence three-farthings, nineteen pounds and three pence halfpenny, twelve shillings and eleven pence three-farthings, eight pounds ten shillings and sixpence, and nineteen shillings and five pence farthing?

3. Find the fifty-ninth part of four hundred thousand and twenty.

4. If you take the sum of 30 farthings, 30 halfpence, 30 pence, and 30 shillings from 30 pounds, how much remains?

THIRD QUARTER.

1. £6,004 17s. 3½d. + £37 19s. 11¼d. + £19,020 16s. 8¾d. + £9 13s. 10½d. + £700 12s. 5¾d. + £8,263 18s. 4d.

2. Nine hundred and thirty-two nuts were given to 37 boys and 29 girls. Each girl received 13, and the remainder were divided equally among the boys. How many did each boy get?

3. Take eight thousand three hundred and five pounds fifteen shillings and seven pence halfpenny from twenty thousand one hundred and four pounds ten shillings and six pence farthing.

4. A man earns twenty-five shillings a week and spends a guinea. How much does he save in a year?

STANDARD IV.—FIRST QUARTER.

1. £1 19s. 8¾d. × 111.

2. £4,187 13s. 7½d. ÷ 6.

3. What is gained by buying 47 yards of cloth for 15 guineas, and selling it at 8s. 9d. per yard?

4. If a gentleman's income is one thousand pounds a year, and he saves £142 5s., how much does he spend daily?

SECOND QUARTER.

1. What is the railway fare for three hundred miles at three half-pence a mile?

2. Reduce 87 chains 19 yds. 1 ft. 11 in. to inches.

3. How many pints of rum are equal to 2½ hhds.?

4. Two cheeses, one weighing 2 qrs. 18 lbs. and the other half as much, were bought at 8½d. per pound. What was the total cost?

THIRD QUARTER.

1. A postman walks 8 miles a day and takes one step at every yard; how many steps will he take in 6 days?

2. How many times would 2 a. 1 r. 25 po. be contained in 77 acres?

3. Find the value of 75 lbs. 8 oz. of gold at £3 17s. $10\frac{1}{2}$d. per ounce.

4. A railway train travels at the rate of 36 miles an hour. How far will it have gone between half-past nine in the morning and a quarter-past four in the afternoon?

STANDARD V.—FIRST QUARTER.

1. What is the cost of five thousand and two vases at 7s. 11d. per pair?

2. Find the price of three million fifty-seven thousand nine hundred articles at £7 16s. $8\frac{3}{4}$d. per hundred.

3. What is the expense of draining 6 fur. 34 po. at £29 13s. 4d. per mile?

4. Find the value of a crop on 35 a. 3 r. 24 po., at £11 9s. 2d. an acre.

SECOND QUARTER.

1. I borrowed £210 for 6 months; how long ought I to lend £180 in return?

2. Make a bill for:—
75 yards of cloth at 7s. 9d. per yard;
$28\frac{1}{2}$ yards of diaper at 1s. 8d. per yard;
49 yards of muslin at $11\frac{1}{2}$d. per yard;
15 hats at 12s. 3d. each;
37 umbrellas at 17s. 6d. each.

3. If I can travel 169 miles for £2 2s. 3d., how far can I travel for £5 1s. $4\frac{1}{2}$d.?

4. A basket contains apples and oranges worth altogether £3. The apples are worth £1 11s. 3d., and the oranges $1\frac{1}{2}$d. each. How many oranges are there?

THIRD QUARTER.

1. Take $\frac{5}{9}$ from $\frac{4}{7}$ + $\frac{2}{3}$.

2. I have $\frac{1}{4}$ of an apple and cut off $\frac{1}{3}$; what part of the apple remains?

3. If a person owe £450, and he can pay only £270, what will his creditors lose in the £?

4. Take from £2, the sum of $\frac{1}{5}$, $\frac{1}{6}$, and $\frac{1}{8}$ of £2.

STANDARD VI.—FIRST QUARTER.

1. If you prefer the biggest share, would you have $\frac{5}{9}$, $\frac{6}{11}$, or $\frac{7}{13}$ of a box of figs?

2. Simplify:—$\dfrac{8\frac{3}{14} - 3\frac{5}{21}}{\frac{8}{15} \text{ of } 3\frac{4}{7}}$.

3. Multiply ·306 by 30·6, and divide the product by ·0027.

4. What is the difference between $\dfrac{\cdot875}{\cdot05}$ and (·875 × ·05)?

SECOND QUARTER.

1. Add together £7·025, $\frac{15}{8}$ of 3s. 9d., ·375 of a guinea, and $\frac{7}{11}$ of 7s. 4d.

2. If $\frac{3}{4}$ of $\frac{6}{7}$ of an estate be worth £2,520, what is the whole estate worth?

3. What decimal of two guineas is $\cdot4\dot{6}$ of a crown?

4. If 3 men or 8 boys can do a piece of work in 21 days, in what time would 5 men and 16 boys do it?

THIRD QUARTER.

1. What is the simple interest on £228 13s. 4d. for 3 years 9 months at $3\frac{1}{2}$ per cent.?

2. If a collector, who is paid 5 per cent. commission, receives £8 15s. for his trouble, how much has he collected?

3. If an ounce of gold be worth £$3\cdot1\dot{6}$, find the value of $5\cdot0\dot{3}$ lbs.

4. What sum will produce £45 in 3 years at 4 per cent.?

STANDARD VII.—FIRST QUARTER.

1. If the interest on a certain sum at $3\frac{3}{4}$ per cent. is £11 5s. less than on an equal sum at $5\frac{1}{4}$ per cent., what is the sum?

2. If 20 men can mow 75 acres in 16 days, how many men will be required to mow 135 acres in 12 days?

3. In what time will £275 gain £43 6s. 3d. at $4\frac{1}{2}$ per cent.?

4. If 70 soldiers can be fed 60 days for £270, how much will it cost to feed an army of 350,000 for a year at the same rate?

SECOND QUARTER.

1. Find the present worth of £978 due in 6 months at $3\frac{3}{4}$ per cent.

2. A cricketer had an average of 30 runs in 8 innings. In the first six he got 6, 38, 23, 46, 0, and 27 respectively. In the eighth he had four times as many as in the seventh. How many did he obtain in the eighth innings?

3. For what sum must goods worth £720 be insured at 4 per cent., so that in case of loss the value of the goods and the premium may be recovered?

4. The circumference of a circle is $3\frac{1}{7}$ times the diameter. What is the diameter of a wheel which revolves 504 times in a mile?

THIRD QUARTER.

1. What per centage of 4 tons is 3 cwt.?

2. Find the amount at compound interest of £400 for 2 years at 4 per cent.

3. If eggs were bought at 11 for a shilling, and sold at $1\frac{1}{2}$d. each, what was the gain per cent.?

4. A person invested £700 in the Three per Cents. at $87\frac{3}{8}$, and sold out when the stock had risen to $90\frac{1}{8}$. What was his gain, reckoning the usual brokerage in both transactions?

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	642.	1,011.	2,932.
2.	562.	241.	7.
3.	26.	272.	393.
4.	12; 9; 8.	27; 32; 55.	36; 60; 42.

STANDARD II.

	FIRST.	SECOND.
1.	43,121.	59,163,312.
2.	3,033.	5,067.
3.	3,955,891.	22 sums.
4.	96; 110; 108.	3s. 11d.; 5s. 3d.; 6s. 4d.

THIRD.

1. 4,708 + 10.
2. 62,710,700.
3. 7,644 trees.
4. 7s. 10d.; 8s. 7d.; 11s. 8d.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	1,685.	£25 7s. 4¾d.	£34,037 18s. 7¾d.
2.	8,049.	£37 13s. 9¼d.	15 nuts.
3.	720 + 320.	6,780.	£11,798 14s. 10¾d.
4.	2,636,600.	£28 5s. 7½d.	£10 8s.

STANDARD IV.—FIRST.

1. £220 9s. 11¼d.
2. £697 18s. 11¼d.
3. £4 16s. 3d.
4. £2 7s.

SECOND.

1. £1 17s. 6d.
2. 69,611 inches.
3. 1,260 pints.
4. £3 18s. 7½d.

THIRD.

1. 84,480 steps.
2. 32 times.
3. £3,535 10s. 6d.
4. 243 miles.

STANDARD V.—FIRST.

1. £989 19s. 7d.
2. £239,631 1s. 2¼d.
3. £25 8s. 0½d.
4. £411 7s. 1d.

SECOND.

1. 7 months.
2. £29 1s. 3d. + £2 7s. 6d. + £2 6s. 11½d. + £9 3s. 9d. + £32 7s. 6d. = £75 6s. 11½d.
3. 405½ miles.
4. 230 oranges.

THIRD.

1. $\frac{43}{63}$.
2. $\frac{1}{6}$.
3. 8s.
4. £1 0s. 4d.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	$\frac{5}{9}$.	£7 19s. 3½d.	£30 0s. 3d.
2.	2$\frac{48}{50}$.	£3,920.	£175.
3.	3,468.	·05.	£191 5s. 4d.
4.	17·45625.	9 days.	£375.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	£750.	£960.	3¾ per cent.
2.	48 men.	80 runs.	£432 12s. 9⅗d.
3.	3⅓ years.	£750.	37½ per cent.
4.	£8,212,500.	3⅓ feet.	£20.

How my School was Examined.

BY THE

HEAD MASTER OF A LANCASHIRE SCHOOL.

STANDARD I.

For the examination in *Writing* the boys were placed back to back, and the following set of words was dictated:

Moment, Quiet, Stick, Glass, Wool, Shelf, Drove. Lady, Curtain, Once.

In *Arithmetic* two sets of sums were dictated for alternate boys:

	(1)	(2)	(3)
A.	295 139 484 276 65	207 138	634 195
B.	350 69 148 535 27	615 438	720 463

Answers:—*A.* (1) 1259; (2) 69; (3) 439.
B. (1) 1129; (2) 177; (3) 257.

Mental Arithmetic questions:

If this slate cost 2d., how many can I get for 1s.?
I put 14d. in the bank, how much is that less than 2s.?
3d. is how much short of half-a-crown?
How many twos in 8?
4 + 9 + 3 + 7 + 8 = &c.

In examining the *Reading* the inspector was very sharp: boys had to read without any hesitancy or stumbling.

Geography was tested by a blank map of England placed in front of the class, and such questions as the following were asked:

What is this? (pointing to the map). What map? Show me the south, east, west. What is opposite to the west? Show me the south of the land—the east. What are these dots for? (towns). Show me some mountains. Show me a county—an island—the coastline.

On a plan of the school, such questions as these were asked: Show me the door I came in by—the door leading to the playground—the room you are sitting in—the master's desk. Where are the 2nd Standard boys sitting?—the 3rd Standard? &c.

STANDARD II.

In *Arithmetic* two sets of sums were given:

A. (1) 37207 − 15089.
(2) 63089 × 609.
(3) 50723 ÷ 9.
(4) A woman had 20 dozen eggs. She took them to market and sold 56. How many did she take home again?

B. (1) 13085 − 9096.

(2) 19709 × 870.

(3) 51025 ÷ 8.

(4) If a girl has a book with 315 pages in, how many days will it take her to read it, supposing she reads' nine pages every day?

Answers:—*A.* (1) 22118; (2) 38421201; (3) 5635 + 8; (4) 184.

B. (1) 3989; (2) 17146830; (3) 6378 + 1; (4) 35 days.

Questions in *Mental Arithmetic*:—

How many cakes could you get for 1s. at 2 for 1½d.?
Add together 9d., 8d., 7d., 6d., 5d.
How many halfpence in 7½d.?
How many buns at 1½d. each for 1s.?
Divide 184 by 4. Divide 36 by 4.

The following passage was given for *Dictation* from the New Royal Reader, No. II.:—

The king's son, seeing pearls and diamonds fall from her mouth as she spoke, desired her to tell him the cause of such a wonder. So the good girl told him all that had taken place at the fountain. The prince was so charmed with her beauty and goodness that he asked her to become his wife.

Questions in *Geography*: What are the zones?—River-basins?—Islands?—Lakes?

What country do you live in?
What part of the world is the Arctic Ocean in?
What side of the equator are you on?
What continent do we live in? &c.

For the *Grammar* test the boys had to pick out of a reading-book nouns and verbs, and to tell the inspector all they could about each. Questions were also asked as, Why is such a word a noun? What is the singular? Why is the noun masculine? Why is the verb regular?

STANDARD III.

In *Arithmetic*, cards, of which the following is a sample, were used:

1. A sum in compound addition.
2. Divide a quarter of a million by 29.
3. A man bought a cart for £5 4s. 6d., and a horse for £3 14s. 6d. more than the cart; how much did the horse and cart cost?
4. A man has £10,000; he pays away £300 17s. 6d., how much has he left?

On other cards were such problems as these:

1. Three dozen chairs and 7 tables cost 400 shillings: if each table cost 16s., what was the price of each chair?
2. Four cakes apiece were provided for 125 children; 25 were absent: how many cakes did each child receive?
3. A man buys a pony and trap for 31 guineas; he pays £21 for the pony. How much less did he pay for the trap than for the pony?

Answers:—Card; (2) 8620 + 20; (3) £14 3s. 6d.; (4) £9699 2s. 6d.

Problems:—(1) 8s.; (2) 5 cakes; (3) £9 9s.

For *Dictation* the following passage was given:—

'Nothing could exceed the satisfaction caused by this event. The king and the queen and all the courtiers were unbounded in their admiration of pussy. At first the queen was frightened to touch an animal of such powers, but after awhile when she saw that pussy kept quiet, she ventured to stroke her on the back. Pussy at once jumped on the queen's knee, and commenced purring, to her great delight.'

Questions in *Geography*:—

What is the chief town in Yorkshire? What is a shire? What is the Pennine range sometimes called? Name a town in Yorkshire which does not manufacture woollen goods. What towns are in North Staffordshire? What towns are on the Mersey? What seaport is on the south of England? Tell me a town in the Cleveland district. Where is Ripon? Which county has the best scenery? Where are chemicals manufactured? What are the Downs? What peninsula is in Yorkshire? Where is the Lake District? What town is on the Ribble? Where is leather tanned? Name a town in the Isle of Wight. Where are the Potteries? Name a town at the mouth of the Tyne. Where are shawls made?—carpets? Where is the 'Black country?' Where are blankets made? What is the most beautiful river in England? Where are hops grown? Where is glass made? &c.

STANDARD IV.

The following are specimens of the cards in *Arithmetic*:—

A. (1) Reduce 175013 drams to cwts., &c.

(2) Divide £158,014 9s. 8d. by 79.

(3) A dealer bought 30 sheep for 75 guineas and sold them for £90. Find the gain on each sheep.

(4) What does a workman get in a year working 313 days at 3s. 6d. a day?

B. (1) £73 15s. 8¾d. × 580.

(2) £298,162 13s. 7½d. ÷ 578.

(3) How many ounce packets of tea could be made out of 5 cwt. 11 lbs.?

(4) If a man buy 16,500 marbles at 30 for a penny, and sell them at five dozen for 3d., how much does he gain?

Answers:—*A.* (1) 6 cwt. 11 lbs. 10 ozs. 5 dwts.; (2) £2,000 3s. 8d.; (3) 7s. 6d.; (4) £54 15s. 6d.

B. (1) £42,796 2s. 11d.; (2) £515 17s. 0½d. + 170; (3) 9136; (4) £1 2s. 11d.

Mental Arithmetic Questions:—

How many threepenny loaves for £1?
How many lbs. in a cwt.?—in ½ cwt.?—in a stone? How many stones in a cwt.? How many 5s. in £5? &c.

The exercise in *Writing* was dictated from Nelson's New Royal Reader, No. IV.:—

'Obey your parents in all things: The proper spirit of obedience is shown when a child complies at once with the wishes of his parents. It does not allow him to stop and argue the point with them, or to set up his own will in opposition to that of his parents. Their duty is to obey without questioning. Children are not always able to see the reason of their parents' requirements. But that does not excuse disobedience.'

Grammar was tested by oral parsing of the sentence —'A pleasanter sight you never saw.' Many questions were asked about each word; and boys were asked to make fresh sentences illustrating the use of the words.

Questions in *Geography*:—

Name the provinces of Ireland. Where is Ulster? What province is west of the Shannon? Name some rivers in Ulster. What lake is connected with the Bann? Name a town on the Foyle. What happened at Londonderry? In whose reign was the siege? Name some rivers flowing east. Name a town on the Boyne. What are the manufactures of Dublin and Belfast? Where are the mountains of Ireland. Name the ranges.

What river is nearest to Edinburgh? and what town? Name some seaports on the east of Scotland. What are the manufactures of Dundee? Name the largest town in Scotland. Where is it? What kind of ships are built there? Where is Paisley?

Name the provinces of North America. Name some mountains in West Province. Name rivers in British Columbia. River flowing north—lakes connected with it. Where is Manitoba? What are the productions of Canada? What rivers run into Hudson Bay? What class of emigrants are required in Canada? &c.

STANDARD V.

Test cards in *Arithmetic*:—

A. (1) Find the cost of 389 at £3 8s. 9d.

(2) Add $\frac{2}{3}$ and $\frac{1}{9}$, and from the sum take $\frac{3}{4}$.

(3) How many benches, each 15 ft. long, would be required for a school of 189 children, if each child required 1 ft. 8 in.?

(4) Make a bill for—

500 yds. tape, at 9d. per score yds.
17 yds. calico, at $3\frac{3}{4}$d. per yd.
$9\frac{1}{2}$ yds. cloth, at 3s. 5d. per yd.
168 thimbles, at 3s. 6d. per dozen.

B. (1) From the sum of $\frac{1}{6}$ and $\frac{2}{3}$ take $\frac{1}{5}$.

(2) A bill:

112 lbs. at $4\frac{1}{2}$d. per lb.
1 cwt. at 15s. per ton.
60 cwt. at 1s. 3d. per cwt.
10 sacks at 1s. 8d. each.

(3) 53 a. 1 r. 36 poles at £1 13s. 4d. per acre.

(4) If 2 tons 7 cwt. 2 qrs. cost £1 11s. 8d. how many could be bought for £1 15s. 10d.?

Answers:—*A.* (1) £1,337 3s. 9d.; (2) $\frac{1}{36}$; (3) 21; (4) 18s. 9d. + 5s. $3\frac{3}{4}$d. + £1 12s. $5\frac{1}{2}$d. + £2 9s. = £5 5s. $6\frac{1}{2}$d.

B. (1) $\frac{19}{30}$; (2) £2 2s. + 9d. + £3 15s. + 16s. 8d. = £6 14s. 5d.; (3) £89 2s. 6d.; (4) 2 tons 13 cwt. 3 qrs.

For the *Writing* exercise one-half of the boys in this Standard had to reproduce a story, and the other half had to write the following passage from dictation:

'It is as necessary to an English statesman in the East that he should be able to write, as it is to a minister in this country that he should be able to speak. It is chiefly by the oratory of a public man here that the nation judges of his powers. It is from the letters and reports of a public man in India that the dispensers of patronage form their estimate of him. In each case the talent which receives peculiar encouragement is developed.'

This Standard was also divided into two parts for the examination in class subjects, one half taking grammar, and the other half geography. The questions in *Geography* were chiefly on Spain, France, and Turkey.

The exercise in *Grammar* was to parse and analyse one of the following sentences:—

A. On mountain summits melts the snow.

B. Wherefore the blush he vainly tries to hide.

Questions were also asked on the formation of words, and the boys were required to make sentences to show their use.

In Stage I. of *Algebra* the following sets of questions were given:—

A. (1) When $a = 3$, $b = 4$, $c = 0$, find the value of $a - [2b + \{3c - 3a - (a - b)\} + \{2a - (b + c)\}]$.

(2) Add $y + \frac{1}{2}z - \frac{1}{3}x$, $z + \frac{1}{2}x - \frac{1}{3}y$, $x + \frac{1}{2}y - \frac{1}{3}z$, and from the sum take $\frac{1}{6}x - y - \frac{1}{3}z$.

(3) Square $3 - 5x + 2x^2$.

(4) Divide $a^4 - b^4$ by $a + b$.

(5) Write down the elementary factors of $a^4 - y^4$, and $ab - ax - bx + x^2$.

B. (1) If $a = 10$, $b = 20$, $c = 30$, find the numerical value of

$$\frac{a^3 + b^3 + c^3}{abc} + \frac{a^2 + b^2 + c^2}{a + b + c + 10}$$

(2) Find the product of $(7x + 1)$ $(5x + 3)$ $(7x - 1)$ $(5x - 3)$.

(3) Divide $x^5 - y^5$ by $x - y$.

(4) Find the elementary factors of $x^2 - 19x + 90$ and $x^2 - ax + 5x - 5a$.

(5) There are $x + y$ rows of trees in a plantation, and $x + y$ trees in each row; if $2xy$ trees are cut down how many are there left?

Answers:—*A.* (1) 9; (2) $x + \frac{13}{6}y + \frac{3}{2}z$; (3) $9 - 30x + 37x^2 - 20x^3 + 4x^4$; (4) $a^3 - a^2b + ab^2 - b^3$; (5) $(a^2 + y^2)(a + y)(a - y)$; $(a - x)(b - x)$.

B. (1) 26; (2) $1225x^4 - 466x^2 + 9$; (3) $x^4 + x^3y + x^2y^2 + xy^3 + y^4$; (4) $(x - 9)(x - 10)$; $(x + 5)(x - a)$; (5) $x^2 + y^2$.

STANDARD VI.

Arithmetical Cards:—

A. (1) If 18 boys can earn £16 in 17 days, what can they earn in $\frac{2}{3}$ of a day?

(2) Find the simple interest on £650 for $3\frac{1}{4}$ years at 5 per cent. per annum.

(3) Multiply £51 17s. $8\frac{1}{2}$d. by $3\frac{5}{17}$.

(4) Simplify 17·45 days + 4·375 minutes − 2·325 hours.

B. (1) A gentleman left $\frac{1}{5}$ of his fortune to one of his sons, $\frac{1}{6}$ to another, $\frac{1}{7}$ to another, and the remainder, which was £1,545, to his wife: What was his fortune?

(2) Find the simple interest on £350 for 21 months at $3\frac{1}{2}$ per cent. per annum.

(3) Subtract 7·50432 from 31·8777335 and add to the result 8·058634.

(4) If one mile of railway cost £5316 12s. 7d. and the total cost is £251,210 14s. 6¾d., find the length of the railway.

Answers:—*A.* (1) 12s. $6\frac{10}{17}$d.; (2) £105 12s. 6d.; (3) £164 18s. 4d.; (4) 17 dys. 8 hrs. 32·875 min.

B. (1) £3,150; (2) £21 8s. 9d.; (3) 32·4320475; (4) 47¼ mls.

STANDARD VII.

Arithmetical Cards:—

A. (1) A broker buys 120 lbs. of cotton at 6⅞d. per lb., 180 lbs. at 6⅝d. per lb., and 240 lbs. at 6½d. per lb. Find the average price per lb.

(2) The insurance on a ship amounts to £1907 10s., which is at the rate of 17½ per cent. Find the value of the ship.

(3) Simplify (·00235 × 3·75) ÷ (·000235 × 37·5).

(4) If 21 men working 11 hours a day can reap 175 acres in 8 days, how many men working 10 hours a day will reap 250 acres in 12 days?

B. (1) A man on an average earned 1½ guineas per week for 11 weeks. He earned £1 15s. per week for 5 weeks, and nothing for 2 weeks; what were his average weekly earnings for the remainder of the time?

(2) If the expenses of 7 persons for 6 days be £17·5875, how much will they be for 5 persons for $2\frac{2}{7}$ weeks?

(3) If gas shares, which cost £350, are sold for £411 5s., what is the gain per cent.?

(4) A and B divided a certain sum of money between them. A got $\frac{641}{1100}$ of it, and his share was £4 11s. more than B's. How much was the whole sum?

Answers:—*A.* (1) 6⅝d; (2) £10,900; (3) 1; (4) 22 men.

B. (1) £2 2s. 10½d.; (2) £33 10s.; (3) 17½ per cent.; (4) £27 10s.

The subjects given for Composition in Standards VI. and VII. were—

A. Outdoor games in winter.
B. Thoroughness in work.
C. Modes of travelling now as compared with former times.

The exercise in Grammar for the same Standards was to parse and analyse one of these sentences:—

A. Around my rustic porch shall spring
Each fragrant flower that drinks the dew.
B. He never fails who dies in a good cause.

Questions were asked on the prefixes.

The boys were required to give the meaning of several prefixes, to give examples, and then to make sentences containing the examples. This was in Standard VI.

In Standard VII. similar questions were asked on the affixes.

In *Geography* the two Standards were taken together, and the examination was oral. Questions were put on the causes that determine climate, on the overland route to India, on Egypt, India, China, &c.

The following set of questions was given to the boys presented in Stage II., *Algebra*:—

(1) Find the G. C. M. of $6ab + 4ab^2 - 2b^3$ and $8a^3 + 4a^2b - 4ab^2$.

(2) Divide $(a^2 - bc)^3 + 8b^3c^3$ by $a^2 + bc$.

(3) Find the value of x in the equation

$$\frac{x}{12} - 3(x - 5) + \frac{x - 10}{4} = 2.$$

(4) I bought 20 books for £10 5s., part of them cost 12s. each, and the remainder 5s. each. How many of each sort were there?

(5) Resolve into factors $(px + qx - ps - qs)$.

Answers:—(1) $2(a + b)$; (2) $a^4 - 4a^2bc + 7b^2c^2$; (3) $3\frac{15}{16}$; (4) 15 at 12s., 5 at 5s.; (5) $(p + q)(x - s)$.

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Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,

Ex-President of the N.U.E.T.

II.

In our introductory paper on Essay Writing last month we gave a few general suggestions followed by a specimen essay. Its subject 'The Writing of Essays' was chosen not because it was a likely one to be prescribed in any examination, but rather because it would afford a means of giving further information and useful hints on the composition of essays, and also form an illustration of the manner in which our suggestions might be carried out. There are one or two points on which it may be well to return to that specimen essay for the purpose of giving further help to our students. First as to the question of length. It was pointed out that essays differ greatly in this respect. The one given was probably longer than could be written in the time usually available for the purpose at an examination, unless indeed the candidate were in full sympathy with his subject, and also a very rapid writer. An essayist however does not as a rule pretend to exhaustive treatment of his subject. The length of an essay must depend on various circumstances,—the conditions under which it is written,—the knowledge of the writer,—the object he has in view. The essay given last month might have closed with the definition deduced from a consideration of the various kinds of essays and their general characteristics. Or a shorter and simpler essay might have consisted of the last two paragraphs with a sentence of introduction explaining briefly the accepted meaning of essay.

Another suggestion contained in the essay was that however limited the time at the disposal of the essayist it would be wise to spend a part of it in making an *outline* of his essay. This plan will help him to duly apportion his time and space to the various points he wishes to deal with, and at the same time to preserve the unity of his composition. We return to this matter in order to urge upon the student that he should not allow the plan or framework of his essay to obtrude itself on the reader. If we look at a fine specimen of a horse we are attracted by its sleek and glossy coat, its rounded contours. These effectually conceal its skeleton from which however it derives its general form and strength. In an exquisite picture the beautiful effect of combinations of form and colour, though it depends on a judicious plan of applying technical rules, makes no definite suggestion of these to the beholder. 'The highest art is to conceal art.' So, however desultory may be the thoughts in an essay, that which will charm is the smoothness and continuity with which it proceeds from point to point, while it is to the well-planned and underlying outline that the firmness and cohesion of the whole is due.

One other remark we would make with reference to the outline or plan of an essay. Its purpose is to assist the writer not to fetter him. Where he has made his own outline, he should not hesitate to modify it, if, in the course of writing, he finds it desirable to make modifications. It would be contrary to the true purpose of essay writing, if the writer were to regard himself as slavishly bound by rigid adherence to an imperfect plan, and so check the free expression of his better thoughts.

Let us now proceed to our second specimen essay. A very common form in which a subject is prescribed is a familiar proverb, or a quotation from some well-known writer. As an example of the former the reader is referred to an essay on the proverb 'Little strokes fell great oaks,' which appears in the January number of the 'Practical Teacher,' Vol. VII., pp. 512-13. The latter may be very fitly illustrated by an alternative subject given at the same time in the recent examination for teachers' certificates:

'Writing Maketh an Exact Man.'

Among those wonderful short essays into which Lord Bacon packed so much meaning and practical common sense there is perhaps not one more remarkable for its condensed expression of thought than the familiar one which bears the title,—'Of Studies.' And among its most pregnant passages must be reckoned that in which the author compares the respective advantages of reading, conversation, and writing, as aids to the student. 'Reading maketh a full man, conference a ready man, writing an exact man.'

It is important to remember that this passage occurs in an essay on *study*, for knowledge of the context of a quotation often affords the best means of arriving at the proper meaning which the author intended it to bear, just as the real intention of an action can be more truly understood by knowing the circumstances under which it was performed. We infer then that Lord Bacon meant by this passage that the practice of writing helps a man to become an accurate student. He goes on to say 'therefore, if a man write little, he had need have a great memory.' From this it appears that writing is helpful to a student by compensating in some degree for defects of memory, or perhaps we should rather say that the practice of writing tends to ensure accuracy by making a defective memory more retentive.

If we would ask the question 'is the saying a true one?' we might regard these facts a sufficient answer,—that the author was a thorough student himself, that he doubtless spoke from personal experience, that he was remarkable for his habitual practice of carefully recording the results of observation and reading.

We may, however, discover a more satisfactory answer still, if we consider the reason of the matter. Now the accuracy and retentiveness of the memory depend on the clearness and strength of the impression a statement or circumstance makes on the mind. In reading, such impression is made through the sense of sight; in listening to a speaker or reader the impression is made through the sense of hearing; but if the act of writing be introduced the impression must be intensified, for not only does the eye see, or the ear hear, but the elements of the thought or statement must be to some extent assimilated by the brain, before they are translated into the muscular actions which guide and control the pen of the writer. In this way, we cannot doubt the attention becomes more complete, and the remembrance of what is written more accurate and lasting.

If anyone should deem the authority of a great example, and a piece of philosophical argument, insufficient warrant for accepting our text as a true maxim, he can apply the test of practical experiment. Let him listen to a lecture, and take notes on it; or let him study a book and make a summary as he proceeds; or make a record of events and mental impressions; and he will assuredly find his knowledge of these various things more vivid and exact. He will find possibly with surprise how vague and indefinite his impressions are when he first attempts to write them down. With continued practice he will discover how thoughts and observations which are at first hazy and nebulous are condensed and crystallised into substantial existence by the very act of writing.

It is needless to give further suggestions of the way in which the student may avail himself of the help which the practice of writing affords. But it may be well to give one caution. Writing, wisely, thoughtfully, applied, may be of the greatest service; but it will be a great mistake to act as if writing could be regarded as a substitute for exercise of memory. It will be useless to make notes of books, or lectures, or personal observations, and then put them away with the thought that now they are written down there is no need for any effort of memory. Writing is a true aid to study not when it is regarded as a crutch or a go-cart to enable the mind to dispense with effort, but when it strengthens mental effort and makes it more effective.

(To be continued.)

The London School Board and the Copy Book Question.

At the meeting of the School Board for London on Thursday, the 8th March, 1888, a debate was raised on the recent decision of the School Management Committee to take steps for the production of a series of head-lined copy books for use in Board Schools.

Mr. Heller moved, 'That it be an instruction to the School Management Committee to take no action on the following Resolution of the Committee of the 11th November, 1887:—

> "That it be referred to the Books and Apparatus Sub-Committee to prepare, in conjunction with the Board Inspectors, a complete scheme for the production of a series of Head-lined Copy Books for use in the Schools of the Board; and that the Books and Apparatus Sub-Committee be authorised to take the necessary steps for their production."'

Mr. **HELLER** briefly recited the history of the case to the effect that, in November last, a small Sub-Committee presented to the School Management Committee a report which recommended that certain sets of copy books should be prepared. The latter committee considered the question, and, although very considerable objection was taken, decided not to send up a recommendation to the Board, but, on their own authority, undertook an entirely new departure in the direction of becoming the publishers of their own school books. Although Mr. Heller, at the time, took exception to this course of action, the committee considered that they possessed the power to make such a departure without bringing the matter before the Board. According to Mr. Heller's view, the general arguments against the Board undertaking this work were unanswerable. He was very much surprised to find that this recommendation should come from those who, in the last Board, and, he believed, in the present Board, had, very properly as he thought, gone against the practice of close competition in everything that related to contracts; but now it was proposed to go even beyond that: there was to be no competition whatever. It was a most unadvisable thing for the Board to undertake the duties of a trading or a producing corporation, and there was at least one case in which the courts had held that a public body constituted by statutory powers could not undertake duties of the nature suggested; and, besides, it would be a serious interference with that open competition and enterprise which had marked school books in recent years. The books at present within reach were infinitely better than those of any previous period, and there was a far greater variety, though it must be admitted that there was a great deal of rubbish in the market. There was only one instance in which a public body had tried the experiment of publishing their own books; and that body was the Commissioners of National Education in Ireland: but they were now retracing their steps. The experiment had killed all chance of competition, and the result was that the schools in Ireland had been, for two or three generations, limited to books which were entirely out of date, with little or no choice. It had been said that the only ground on which the present proposal was made was that of economy, but he (the speaker) did not believe that the Board, even under the admirable business arrangements which some of their members had introduced, would be able to produce the books as cheaply as others in the ordinary course of business. In making inquiries into the matter, he had found that the price of one particular specimen of paper submitted to the committee (and which he then had before him) was high, having regard to its quality and weight; which fact showed, on the very threshold, that the committee could not produce books of the quality and at the price which had been produced in the past. He asked if any expenditure in connection with the matter had yet been incurred.

The **CHAIRMAN** of the Board replied in the negative.

Colonel **PRENDERGAST** asked whether Mr. Heller meant to assert that the Board were about to undertake the position of publishers proper.

Mr. **HELLER** replied that he meant to assert that, where the Board had to supply their own schools, they were undertaking, in the strictest sense of the word, the production of books.

Mr. **LOBB** seconded the motion on the ground that it would be a great injustice to the trade generally. No one could shut his eyes to the fact that the provincial School Boards would follow the example of the London Board, for the former copied the latter in almost everything. One could imagine the feeling in the trade amongst firms who had laid themselves out for the production of copy books for the last quarter of a century, when they knew that their business would slip out of their hands. It would be a great hardship to teachers to confine them to one uniform set of copy books. It would also inflict a great hardship upon some of those members of the Board who, like himself, gave a large portion of their time to the commercial part of the Board's work. He thought that the results of the Store ought to be a warning to the Board not to extend their commercial operations. There might be, on the next Board, two or three ladies who would insist on managing the Store again; and it could not be guaranteed that those ladies would have the capacity for business necessary for the work; neither could it be guaranteed that the Board would have a gentleman with the business capacity and knowledge of the work that the present Chairman of the Board had. Mr. Lobb counselled the Board not to accept the School Management Committee's proposal, which would only create further troubles. He (the speaker) then referred to the trouble which he had experienced during the past five years—hard work, worry, loss of time, misinterpretations, &c., and concluded by declaring his belief that economy had had nothing whatever to do with the decision of the School Management Committee in this case.

Mr. **RUSSELL ENDEAN** pointed out that, if the Board had had no choice in the matter of head lined copy books, then there would be some reason for the present proposal; but, so far from this being the case, they could select out of the vast number of copy books prepared by distinct and independent publishers such as might be found suitable and appropriate for use in the Board Schools. The Board had the choice of the best styles of writing that could be produced, and the publishers, knowing their own interests better than the Board did, produced the best styles for the acceptance of the Board. If the Board were to pursue the course suggested, they would provoke great dissatisfaction out of doors, and produce in the end a calamitous state of things similar to that in the Store Department, from which the Board had only just been able to extricate themselves. He urged the Board to support Mr. Heller's motion.

Colonel **HUGHES**, M.P., said that the School Management Committee proposed to produce a copy book which they considered most suitable. After the experience which the Board had had, they must have found some points in copy books which commended themselves more than others; and, with regard to the production of copy books of the most suitable kind (and by production, he understood, was meant the advertising for tenders), the Board would obtain the requisite quantities by public competition. Those who tendered would be bound by such tenders, but he (the speaker) would like the School Management Committee to come to the Board with a form of tender and an estimate of the number of copy books required, and then the necessary authority could be given for the tendering to take place. The Board were not going to undertake the duty of publishers. If a good copy book were produced, let every School Board in the country have the opportunity of adopting it; the Board did not want to play the dog in the manger about it.

Mr. **GOVER** wanted to know where the Board were going to stop; if the principle were applied to copy books, why not apply it to other things. He contended that there was no end to improvement. If he thought that this Board, or the Sub-Committee, or the School Management Committee were the wisest people in the world, now, and ever would be, then, perhaps, he might be disposed to agree and to think their course of action wise, but he was satisfied that they were not so. He objected to teachers having their choice limited in the way proposed, and could see no advantage to be derived from it, even if the Board selected the best kind of copy book.

The Rev. J. J. **COXHEAD** was not surprised at the vigorous opposition to the proposal of the School Management Committee, which, no doubt, was, to a certain extent, dictated by interested persons outside the Board. The Board were prepared, he believed, within certain limits, to trust the School Management Committee, and, without looking deeply into the question themselves, would be prepared, where the committee made a recommendation of this kind, to adopt it, but, of course, those who supported it must meet the objections made to it. One objection made was that the plan would not be economical, but the answer to that was that, as every copy book bought under the present system must pay a certain profit to the compilers, obviously it must be more economical for the Board to prepare their own copy book than to take one from outside. Mr. Coxhead was not satisfied with the headings of the copy books now in the hands of the children, nor was he satisfied with the school books, and he believed that the Board would be adopting a course very much in the interest of education if they placed in the hands of the School Management Committee such a power as would enable them to prepare what would be considered a satisfactory copy book, which, however, would only take its place amongst the copy books published by other firms. These remarks would apply as much to reading books as to copy books, and, until a satisfactory reading book should be prepared, the Board were losing one great instrument in the education of children. The reading books were not satisfactory either in respect of the technical education of the children, the education of their emotions, or their scientific education; and if the present Board did not take up the question, he (Mr. Coxhead) hoped that some future Board would do so in a most serious manner. Considering that there was on the Board a fund of technical and special knowledge, something ought to be done in this direction for the benefit of the schools.

Mr. **STONELAKE** argued that, if, as Mr. Coxhead said, the publishers made a profit which the Board would not require to make, therefore the Board would save money, but many people began business with the hope of making a very good thing out of it but often came to a very bad ending. Any loss made by the Board would have to be borne by the ratepayers at large. If the plan were to be adopted with regard to copy books, why not extend it to slates, printing, coal, and other things; indeed, why not buy a coal mine and manage it? The Board, before extending their operations, should remember their past experience with regard to the store, and how lamentably they failed in their shopkeeping arrangements. He (the speaker) would like to sweep the store away altogether for the reason (if for no other) that the Board were not established for shopkeeping, but for the education of the children of the metropolis. The proposal, if adopted, would be a restriction of choice, for having chosen one particular set of books, the Board could not, without great expense, throw that aside and take another. The Board had the opportunity, under the present system, of making the best possible terms with the best publishers, because it was well known that payment was sure. Mr. Stonelake urged the Board to stick to the work for which they were elected, and not to try to take the bread from other people.

Mr. **MARK WILKS** stated that he voted for the proposal in the committee, though he had some hesitation at the time in doing so, but he had been quite convinced since that the step would be a false one, and, if he had wanted further conviction, it had come from Mr. Coxhead in his speech. He was convinced that the variety insisted upon by Mr. Heller was essential. It was said in the School Management Committee that copper plates were to be prepared, the plates being the property of the Board, and that copies were to be printed off by the Board's printers. Mr. Wilks declared that he would now vote for Mr. Heller's motion, his former vote in the committee having been given before he knew so much about the question.

Mr. **BARNES**, like Mr. Wilks, had voted for the proposal in the committee, and, like him, too, he should now vote against it. It was shown in the committee that there was an immense saving through the Board having their own registers, and it was argued that there would be a great saving if the Board were to produce their own copy books. But there was a broad line to be drawn between registers and ordinary school books. While Mr. Barnes strongly objected to the Board becoming publishers, he had an idea that copy books came under a different category, and were very closely allied to registers, but, on looking through the books on the requisition list he found 27 different sorts of copy books which could be classified under three or four different kinds of writing. The inspectors had been asked to go through the different sets of books now in use, and to pick out from them all the good points, in order that they might be embodied in one superior set for the use of the Board, and be put out to contract for the production of the requisite number. That might be very well for a tradesman to do, but he (the speaker) did not think it was a fair or proper thing for the Board to pick the brains of the publishers in order to produce copy books, and then to compete against them. He was not quite sure about the economy of the thing, and, besides that, the whole of the publishing trade was against them.

Professor **GLADSTONE**, F.R.S., having attended all the meetings at which the question was considered and having read all that had been written on the subject, was of opinion that there were advantages and disadvantages in the proposal, and, so far as he was concerned, he would not care very much whether the proposal were carried or not. He would explain how the case had originated, for there was a good deal of history that had not come out. The Books Sub-Committee had the subject of copy books before them, and a Special Sub-Committee was appointed to look into it. Professor Gladstone stated his belief that the subject of copy books was the cause of the formation of the store in the first instance. Recently there had been a great demand in the Board Schools for the Graphic Copy Book, and, judging from its merits, it ought to be on the Board's list, but it was published by a Company consisting of a large number of Teachers who hold shares of £10 each, there being few teachers who hold many shares, and it was said that this matter was being pushed in a way of which the Board could not approve; and other books might be brought forward in the same way. The same rule might be applied to teachers that was applied to the Board Inspectors, viz., that no books in which they had an interest should be put upon the requisition list. The Board were cutting the Gordian knot by refusing to accept any copy book and producing a copy book of their own. The proposed course of action, after a very able discussion, was carried in the School Management Committee, though the majority was not a large one; then followed an outcry from the publishers and some members of the Board. It was assumed by the publishers that the Board were going to publish, but there was no intention of that kind, the Board would only produce books for their own schools. Then it was stated that there would be only one set and that the power of choice would be taken from the teachers. But there was no intention of having only one set or one kind of head lines. There was no reason to confine the teachers to the Board's books, any other books that the Board chose might be added to the list; all that was proposed was that the Board should produce their copy and exercise books with headlines. It was said that the Board were interfering with the profits of publishers, but one publisher had said that that was not so for publishers' profits were so small as to be hardly worth talking about. Professor Gladstone could not see that any injustice would be done because the Board had never made any arrangement with any publisher for producing copy books. Then there was the educational argument that the Board were stereotyping a style, and the speaker announced that he had more sympathy with that argument than with any other, for he would be opposed to having only one style of copy book. Some members had brought forward the old calumnies about the store, but it should be known that copy books cost the Board £50 a week, and if there were any saving of any percentage, it would come to a large sum in a year. The Board ought not to fetter their teachers in the choice of variety, and this would be easily avoided by allowing the Board's copy books to come into circulation in their schools amongst other copy books. Professor Gladstone concluded by expressing himself indifferent as to whether Mr. Heller's motion were carried or not, and, for that reason, he would not be disposed to support it.

Mr. LYNN remarked that, if this were a discussion as to the merits of any particular set of copy books, he did not think it would be worth while for the Board to consider it, for in a matter of that kind the School Management Committee should have free hands. The production of the copy books was thoroughly understood by the Committee to mean their preparation at the Board's expense; there had been no suggestion of tenders for their supply, and if the proposition were what Colonel Hughes thought it was, he (the speaker), for one, would not oppose it. Mr. Coxhead had put another colour, which Mr. Lynn believed to be a false one, upon the proposition, viz., that the School Management meant to have one set of copy books; but, when that was found to be weak, it was said that the Board could have more than one set; now Mr. Coxhead said that it was not intended to produce copy books in competition with others. Mr. Lynn, however, contended that the School Management Committee did intend to publish the copy books. The present practice was that when those in the trade and those who made themselves specialists in school material had undertaken the expense and preparation of any article, the article, when produced, was submitted to, and examined by, the Board through their School Management Committee, who selected such articles as were good, and allowed them to be used in the schools. If the School Management Committee were to try, as a Committee, to satisfy Mr. Coxhead, a great amount of diversity would be found. The Members of the Board were not skilled in copy book preparation, which would have to be left to the Board Inspectors, who, probably, had had no experience in the matter. Some members thought the preparation meant only writing down twenty-four sentences in a bad handwriting and leaving the publisher to make it good, but he (the speaker) knew from his own experience that it was a very different matter indeed. The expense would be very considerable, more especially when it was considered that the only area of distribution was the Board Schools; and, if four sets of books were provided, the expense would be increased. When a publisher prepared a set of books he did so to compete through the length and breadth of the land, but, if the Board themselves published, they cut off one of his best customers; though the profit to the publisher by the Board's custom was nothing comparable with the initial expense of the plates, which expense was spread over the whole country. If Dr. Gladstone were to appeal to the printers of the copy books (persons who had nothing to do with the preparation of the books themselves), he would find that the amount charged by them would differ very little from that which would be charged by the publishers, on account of the competition. Besides, the Committee's line of action would tend to force on teachers a uniform style of writing. One teacher had stated to the speaker that he did not use any copy books in his school lower than the Third Standard, the boys up to that stage being taught by means of the blackboard, according to a style of his own, and then he selected from the list those books which were best suited to his wants. If any member would take the trouble to look through the sixty or seventy copy books on the list, and were to put on the backs the dates when they were published, he would find that the books improved by the lapse of years, for the reason that, in the production of copy books, as in everything else, there had been constant improvement—improvement in engraving, machinery, style of writing, and so forth. If the Board endorsed the plan of their Committee, there would be enormous difficulty in inducing any future Board to lay aside their stock for producing books in order to adopt any improvement.

The Rev. C. E. BROOKE rose in consequence of the speech of Dr. Gladstone, from whom he gathered that the whole system of the Board was to be revolutionised in consequence of the Board's fear of getting into the hands of certain teachers whose names were unknown, and protested against such an idea as being monstrous. If the Board were going to have no dealings with any society in which a teacher might be a shareholder, he did not know where the Board would land themselves. He considered that the objections against the proposal of the Board having their own copy books were unanswered and unanswerable. Though he (Mr. Brooke) was looked upon by his tory friends as a radical, and by his radical friends as a tory, he was as much a free trader in copy books as in anything else.

Mr. HELBY said that if there had been any idea of the Board becoming publishers, he would not have agreed to the proposal in committee. If the Board sanctioned the committee's plan, it meant that certain styles of writing would be approved. Having referred generally to the various styles of writing in the schools, Mr. Helby stated that a large number of teachers, who seemed to prefer the Civil Service style, had asked for what were known as the Graphic Copy Books to be supplied to them. He then went on to explain that, when the proposed headlined copy books should have been prepared, tenders would be obtained in the usual way; which, he argued, could not be called publishing. Such a course would give the Board the opportunity of getting the best articles at the lowest cost, and would, further, secure a uniform quality of paper, which, at the present time, was by no means the case. It was a well known fact that, not only with copy books, but with reading books and all other things, it was not the best book but the best touter in the schools that won.

The Rev. A. A. W. DREW expressed his surprise at Mr. Helby taking the line of argument which he did, because Mr. Helby had always, prior to the present case, advocated the system of open tendering.

After a reply from Mr. Heller, a division was taken on his motion, which resulted as follows:—For, 20; against, 15. The motion was therefore carried.

Mr. HELLER then moved, and Mr. LOBB seconded, 'That, in the opinion of the Board, it is inexpedient for the Board to undertake the duties of publishers; and that it be an instruction to each Committee not to adopt any course involving new principles of action or new expenditure except under the authority of the Board; but, after a short discussion, the motion was withdrawn.

Pupil Teacher Examination Papers (Scotland).

28th January, 1888.

END OF THIRD YEAR.

FIRST PAPER.

(*Two hours and a half allowed for this Paper.*)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word 'Majestically.'

Write in small hand, as a specimen of copy-setting, the sentence 'Wearing the white flower of a blameless life.'

Arithmetic.

MALES.

1. A can give B 100 yards' start in a thousand yards; B can give C the same start in the same distance. How many yards' start can A give C in a thousand?

A's walking = $\frac{1000}{900}$ or $\frac{10}{9}$ of B's

Similarly B's = $\frac{10}{9}$ of C's

∴ A's = $\frac{10}{9} \times \frac{10}{9} = \frac{100}{81}$ of C's

that is while A does 1000, C does $\frac{81}{100}$ of 1000, or 810 yards for A's 1000

∴ A can give C a start of $\underline{190}$ yards. Ans.

2. A man transfers £5000 from the Three per Cents. at 75, and buys 4 per cent. debentures at par. What is the difference in his income?

(*a*) By selling the £5000 at 75 he realizes $\frac{£5000 \times 75}{100} = £3750$

(*b*) £3750 will purchase just that sum in the debentures at par.

$$\text{1st income} = \frac{£5000 \times 3}{100} = £150$$

$$\text{2nd income} = \frac{£3750 \times 4}{100} = £150$$

∴ There is no change in his income.

FEMALES.

1. Write in decimal notation 5 hundredths, 5 hundreds, 5 millionths; add them together and multiply their sum by ·001.

(*a*)
5 hundredths = ·05
5 hundreds = 500·
5 millionths = ·000005
Their sum = $\underline{500·050005}$

(*b*) 500·050005 × ·001 = $\underline{·500050005}$. Ans.

2. Reduce 2·083 of £16 16s. to the decimal of £21

$$\frac{£16·8 \times 2·083}{£21} = ·8 \times 2·083$$

$$= \underline{1·6664}. \text{ Ans.}$$

3. Whether will the fraction $\frac{11}{24}$, when converted, produce a terminating or a repeating decimal fraction.

$\frac{11}{24}$ will produce a repeating decimal because its denominator, 24, when reduced to its prime factors = 2 × 2 × 2 × 3
11 not being a multiple of 3, there will be a remainder, and hence the decimal will repeat.

4. Divide the difference between 1 and ·992748 by ·0074, and prove the truth of your answer by vulgar fractions.

(*a*) 1 − ·992748 = ·007252

(*b*)

```
·0074)·007252(·98
       666
       ---
        592
        592
```

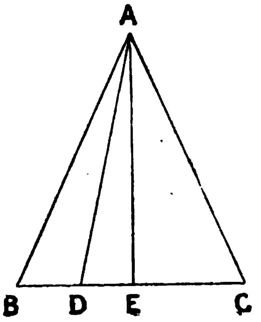
(*c*)
$$·007252 \div ·0074 = \frac{7252}{1000000} \div \frac{74}{10000}$$
$$= \frac{7252}{1000000} \times \frac{10000}{74}$$
$$= \frac{10000}{1000000} \times \frac{7252}{74}$$
$$= \frac{1}{100} \times 98 = ·98.$$

Euclid.

1. If the square described on one of the sides of a triangle be equal to the squares described on the other two sides of it the angle contained by these two sides is a right angle.
Euclid, Bk. I., Prop. 48.

2. If a straight line be divided into two equal parts, and also into two unequal parts, the rectangle contained by the unequal parts, together with the square on the line between the points of section is equal to the square on half the line.
Euclid, Bk. II., Prop. 5.

3. The square on any straight line drawn from the vertex of an isosceles triangle to the base, is less than the square on the side of the triangle, by the rectangle contained by the segments of the base.



Let ABC be an isosceles triangle, having the sides AB, AC equal to one another, then if AD be any straight line drawn from the vertex A to the base BC, the square on AD is less than the square on AB (or AC) by the rectangle BD, DC.

Bisect BC in E. Join AE. AE shall be perp. to BC. Because AB = AC, and AE is common to the two triangles ABE, ACE and the base BE = EC, then (I. 8) the angle BAE = angle CAE, and the other angles are equal to the other angles (I. 4). Hence the angle BEA = the angles CEA, and they are adjacent angles; therefore each of them is a right angle, and therefore AE is perp. to BC.

Again, because BC is cut equally in E and unequally in D, the rect. BD, DC together with the square on DE is equal to the square on BE. To each of these equals add the square on AE. Then the rectangle BD, DC together with the squares on DE and EA is equal to the squares on BE and EA. But the square on AD is equal to the squares on DE and EA (I. 47), and the square on AB is equal to the squares on BE and EA. Therefore the rect. BD, DC together with the square on AD is equal to the square on AB. That is, the square on AD is less than the square on AB (or AC) by the rectangle BD, DC.

Q.E.D.

Algebra.

1. Solve the following equation:—

$$\tfrac{1}{9}(4x-21) + 3\tfrac{3}{4} + \tfrac{1}{4}(57-3x) = 241 - \tfrac{1}{12}(5x-96) - 11x$$
$$\frac{4x-21}{9} + \frac{15}{4} + \frac{57-3x}{4} = 241 - \frac{5x-96}{12} - 11x$$
$$16x - 84 + 135 + 513 - 27x = 8676 - 15x + 288 - 396x$$
$$16x - 27x + 15x + 396x = 8676 + 288 + 84 - 135 - 513$$
$$427x - 27x = 9048 - 648$$
$$400x = 8400$$
$$x = \underline{21}. \text{ Ans.}$$

2. Find the greatest common measure of—

$110 - 13x - 2x^2 + x^3$ and $x^4 + 7x^3 + 7x^2 - 15x$

Arranging terms and eliminating x from the 2nd.

$$x^3 - 2x^2 - 13x + 110\,)\,x^3 + 7x^3 + 7x - 15\,(1$$
$$\underline{x^3 - 2x^2 - 13x + 110}$$
$$9x^2 + 20x - 125$$

$$x^3 - 2x^2 - 13x + 110$$
$$\underline{\qquad\qquad 9}$$
$$9x^2 + 20x - 125\,)\,9x^3 - 18x^2 - 117x + 990\,(x - 38$$
$$\underline{9x^3 + 20x^2 - 125x}$$
$$-38x^2 + 8x + 990$$
$$\underline{\qquad\qquad 9}$$
$$-342x^2 + 72x + 8910$$
$$\underline{-342x^2 - 760x + 4750}$$
$$832\,|\,\underline{832x + 4160}$$
$$x + 5$$

$$x + 5)\,9x^2 + 20x - 125\,(9x - 45$$
$$\underline{9x^2 + 45x}$$
$$-45x - 125$$
$$\underline{-45x - 125}$$
$$\therefore\ \underline{x + 5} = \text{G. C. M.}$$

Simplify the fraction $\dfrac{\frac{1}{2}(x+1\frac{1}{3})-\frac{2}{3}(1-\frac{3}{4}x)}{1\frac{3}{4}-\frac{1}{3}(x-3\frac{1}{4})}$

$$\frac{\frac{1}{2}(x+1\frac{1}{3})-\frac{2}{3}(1-\frac{3}{4}x)}{1\frac{3}{4}-\frac{1}{3}(x+3\frac{1}{4})}=\frac{\frac{x}{2}+\frac{2}{3}-\frac{2}{3}+\frac{x}{2}}{\frac{7}{4}-\frac{x}{3}-\frac{13}{12}}.$$

$$=\frac{x}{\frac{21-4x-13}{12}}$$

$$=\frac{12x}{8-4x}$$

$$=\frac{3x}{2-x}\quad\text{Ans.}$$

Grammar.

'All the remedy *that offered* to my thought at *that* time was to get up into a thick bushy tree *like* a fir, but thorny, which grew near me, and where I resolved to sit all *night*, and *consider* next *day* what death I should die, for as *yet* I saw no prospect of life.'

1. Analyse the above passage.
2. Parse fully the words in italics.

SENTENCES	KIND	CONNECTIVE	SUBJECT	PREDICATE	OBJECT	EXTENSIONS
1. All the remedy was to get up into a thick bushy tree like a fir but thorny	Princ.		All the remedy	was to get up into a tree &c.		
2. that offered to my thought at that time	sub. adj. to 1		that	offered	(itself) to my thought (indirect)	at that time (time)
3. which grew near me	sub. adj. to 1	which	which	grew		near me (place)
4. and where I resolved to sit all night	sub. adj. to 1	and where	I	resolved	to sit all night (completion)	(where) (place)
5. (and where I resolved) to consider next day	sub. adj. to 1	(and where)	(I)	resolved	to consider next day (completion)	where (place)
6. what death I should die	sub. noun to 5		I	should die	what death	
7. for as yet I saw no prospect of life	sub. adv. to 1—6.	for	I	saw	no prospect of life	as yet (time)

PARSING.

That—simple rel. pron., anteced. 'remedy,' 3rd pers., sing., neut., nom., subj. of 'offered.'
offered—reg. trans. (here used intrans.) verb, act., indic., past indef., 3rd pers., sing., agr. with 'that.'
that—demonstr. adj., pointing out 'time.'
like—adj. qual. 'tree' (some call *like* a prep. but it is better to make it an adj. with 'to' understood).
night—abstr. noun, neut., sing., obj. 'of time.'
consider—reg. trans. verb, act., infin., pres., gov. by 'resolved.'
day—abstr. noun, neut., sing., obj., of 'time.'
yet—adv. of time modif. 'saw.'

3. Point out the Latin prefixes in the above passage and indicate their exact force in each case.

LATIN PREFIXES.

ob- in 'offer' means 'against' or 'in the way of.'
re- in 'resolved' means 'again.'
con- in 'consider' means 'together.'
pro- in 'prospect' means 'before.'

SECOND PAPER.

(*Two hours and a half allowed for this Paper.*)

1. Draw a map of India, indicating the chief divisions and mountain ranges.

2. State what you know of Burmah.

A strip on the N.W. of the Malay Peninsula extending from Bengal along the coast to the root of the peninsula was till recently known as British Burmah, but is now under the government of India. It has an area about equal to Great Britain and is divided into the provinces of Aracan, Pegu, and Tenasserim. It is specially valuable for rice and teak. The population has increased rapidly under British rule. British Burmah is the only part of Indo-China in which railways have been introduced, two starting from Rangoon, one for Prome, and the other northward by Pegu. Proposals are now being made for a railway from the Gulf of Siam to the Chinese frontier, with the view of extending commerce with the rich provinces of south-western China.

On January 1, 1886, the former kingdom of Burmah, with Mandalay on the Irawaddy for its capital, was added to the British dominions, so that Britain has now the command of the whole course of the Irawaddy as far as Bhamo. There has been much trouble with the Dacoits for some time.

3. Write short descriptive notes on the following places:—Teheran, Singapore, Suakim, the Zambesi, Port Hamilton, Aleppo, Borneo, and New Guinea.

Teheran, now the capital of Persia, consists of splendid edifices and magnificent gardens intermingled with mud huts. In summer the heat is so great that the Shah and his court encamp out on the plain of Sultania, 150 miles from the city.

Singapore, on a small island at the extremity of the Malay Peninsula, is a British seaport lying on the route from India to Australia and Eastern Asia, and hence it is the most important seat of marine commerce in Indo-China.

Suakim is the only port of Nubia, on an island in the Red Sea; has a good harbour, and is a great place for the embarkation of pilgrims on their way to Mecca. The British made great use of it in the last Egyptian war.

The Zambesi, a large river of South Africa, has numerous head-streams, in a region thickly streaked with rivers partly belonging to its basin and partly to the Congo. After an eastward course, estimated at 1350 miles, through a fruitful and populous country, it falls by several mouths into the channel of Mozambique. About 800 miles from its mouth are the Victoria Falls. Like all the other great African rivers, it periodically overflows its banks.

Port Hamilton. This station of the British Navy consists of three small islands situated about forty miles south of Corea, commanding the straits of that name, which lead from the China Seas to the Japanese Seas. The three enclose a harbour two miles long by a mile broad, and from nine to twelve fathoms deep. As it both commands the straits and forms an available coaling station, Port Hamilton is considered to be of much importance. There was some talk about evacuating Port Hamilton.

Aleppo, or Haleb, a town in Syria, occupies an oasis situated about midway between the Mediterranean and the Euphrates, where that river in its middle course approaches nearest the sea, and has hence been from time immemorial an important trade centre.

Borneo is a large island of the Malay Archipelago, divided into various states. Holland claims slices along the south, east and west of the island. In reality, this immense tract is parcelled out into various native states. Those on the coast are more or less under Dutch influence. Of the interior little is known. On the N.W. coast is Sarawak, under British influence, though not a British dependency, being governed by an English Rajah, Charles J. Brooke, whose philanthropic efforts, and those of his predecessor, have done much to restore the ancient prosperity of the native states. Borneo is considered to be physically one of the most attractive portions of the earth's surface.

New Guinea, close to Australia, on the north, is about three and a third times the size of Great Britain. It is mountainous, has dense forests, haunted by many gay-plumaged birds, and among these the bird of paradise. The natives are Papuans, and are of a very dusky hue. Some are very friendly, others fierce and intractable. The island is shared by the Dutch, Germans, and British. Not much is known of the interior, but exploring expeditions are now at work. Port Moresby is the British official centre.

History.

1. Name the leading Statesman, the leading General, and the leading Admiral, of the reign of George III. Give a brief account of *one* of them.

In the reign of George the Third, William Pitt (the younger) was the leading Statesman, Lord Nelson the leading Admiral, and the Duke of Wellington the leading General.

Wellington.

Lord Wellington (Arthur Wellesley) was the greatest soldier of modern times. Third son of the Earl of Mornington, he was born in Ireland, 1769. After finishing his education at Eton, he entered the army as ensign, and ten years after took part in the war in the Carnatic. In 1803 he gained the great victory of Assaye. Entering Parliament, 1807, he became Secretary for Ireland. Succeeding Sir John Moore in command of the armies in the Peninsula he, by a series of unexampled successes from 1809 to 1813, drove the French out of Spain across the Pyrenees. After attending a Congress of the European Powers at Vienna, he was called upon to take the field against Napoleon, whom he met for the first time at Waterloo, and where he utterly defeated him.

In 1822 he entered on his career as a statesman, became Prime Minister in 1828, and continued to be the trusted adviser of his sovereign till his death in 1852.

2. State the circumstances that led to the American war of Independence, with the name and date of the first battle.

The chief causes of this long and disastrous conflict are to be sought in the stubborn self-will of George III., and in the equally absurd self-conceit of his English subjects.

Grenville, the English Prime Minister, having determined to tax the colonists for the benefit of the empire, adopted the plan of raising the revenue by requiring that certain documents should be on stamped paper.

The colonists at once became alarmed, and declared that 'taxation without representation was tyranny.' So strong was the feeling, that riots took place at Boston and elsewhere; and the colonists determined to do without English goods, so as to escape the hated imposition. All was in vain, for the king and people at home were deaf to their remonstrances; and in 1766, although the Stamp Act was repealed, the English Parliament passed a bill declaring the legislative supremacy of England over her colonies. Shortly afterwards, a new scheme of taxation was introduced, by which the revenue was to be raised by *port duties*, not by internal excise. The feeling on both sides now became more bitter; and when the other duties were removed, that on tea was retained more to mark the superiority of the English Parliament than as a matter of finance.

A circumstance, in itself trifling, brought matters to a crisis. The East India Company had a great stock of tea in its warehouse, and it was allowed to export this to America free of English duties, so that in the colonies it could be sold at a very low price, but the hated colonial duty had still to be paid. Three ships laden with tea arrived in Boston. A band of men, dressed as Mohawk Indians, boarded them and flung the chests into the sea.

When the news reached England the commercial classes wished to bring about reconciliation, but *the King, the governing classes, and the great body of the people*, maintained that the time for conciliation was over, and that America must be subdued.

A congress assembled at Philadelphia professed loyalty to the king, but refused to pay taxes imposed by imperial authority, and entered into a rigid agreement neither to consume British goods nor to export a single product of their own.

At home Lord North proposed that as long as a colonial legislature paid a reasonable sum towards the imperial expenses it should be exempted from all imperial taxation. Had this concession come earlier all would have been well; but it now came too late. Two months later General Gage sent a party to destroy a quantity of stores at *Concord*, but it was attacked and badly treated. The whole population arose, and Gage was shut up in Boston. He then fought and won the battle of Bunker's Hill (1775).

Composition.

Write a letter on 'Parliament' or on 'The best methods of teaching Needlework in a School.'

Glasgow, 28th Jan., 1888.

Sir,

As my experience in teaching needlework has not been wide enough to warrant me in taking upon myself to give the 'best methods' of teaching needlework, yet I shall endeavour to give you the methods of teaching employed by the lady who is responsible for this subject of instruction in our school.

We follow the syllabus as given in Schedule 3, and according to it the Infants are given needle drill as it is called in which we practise them in the best manner of holding wires, wool, how to hold sewing-needles, with the management and use of the thimble. Standards I. and II. can be taken together after a little, as the work of II. is not much in advance of I. In fact we think also that Standard II. might take a little of Standard III. work, and that Standard III. might take the easier stitches of Standard IV., as the leap from III. to IV. is a pretty long one. Every class should have a teacher of its own and if the class is large it should be cut up into sections of twenty or thirty. For darning, marking, and drawing for cutting out, if there be no frames we use the blackboard and find the method very effective—Standards IV. and V. being taught successfully in this manner last year.

Should there not be sufficient teachers to have one at every class, all the Standards are not taken every day. We found this plan to work very well as the Mistress had time to superintend and see what every one was doing, and how she was doing it.

All odd pieces of cloth left from cutting out garments were used by the scholars in learning and practising new stitches. The older girls in helping the younger ones to fold their slips for hemming, &c., got additional practise themselves and confidence in their own work. By utilising the more advanced of the members of the younger Standards had also a beneficial influence on the ambitious ones who felt themselves as it were little mistresses.

Simultaneous teaching was used a good deal and found to be not only a successful method but a good one for economizing time and labour.

I am, Sir,
Your obedient servant,
H. M. Inspector, Esq. Mary Teacher.

Latin.

SECOND STAGE.

(*Answers to be written on a separate paper.*)

1. Explain the meaning and use of the gerund and gerundive of a Latin verb, and illustrate by example.

The gerund is a verbal substantive and has four cases, the genitive, dative, accusative, and ablative, and governs the same case as its verb. Its nominative is supplied by the infinitive, and the accusative is used only when governed by a preposition: in all other cases the infinitive supplies the accusative. N. *Scribere difficile est*, writing is difficult. G. *Ars scribendi*, the art of writing; *Puer paratus est ad scribendum*, the boy is ready for writing; *Puer fatigatus est scribendo*, the boy is wearied with writing.

The gerundive is a passive participle generally implying the idea of necessity or possibility, and is the agent by whom the action is to be done in the dative instead of the ablative, with the preposition *a* or *ab*, as: *Pater amandus est*, the father must be loved; *Mihi scribendum est*, I must write; *Bellum mihi gerendum est*, war must be carried on by me.

2. Give a list of adjectives that govern the ablative case.

The following adjectives and participial adjectives govern the ablative :—Dignus, indignus, contentus, fretus, natus, satus, ortus, genitus, editus, creatus, and the like, denoting origin, as dignus honore, worthy of honour.

3. Write out the future and present subjunctive of *eo* and *prosum*.

FUTURE.		PRESENT SUBJUNCTIVE.	
Sing.	*Plur.*	*Sing.*	*Plur,*
Ibo	ibimus	eam	eamus
Ibis	ibitis	eas	eatis
Ibit	ibunt	eat	eant
Proderim	proderimus	prosim	prosimus
Proderis	proderitis	prosis	prositis
Prodent	proderunt	prosit	prosint

4. Translate, parsing the words in italics.

(*a*) Apollinis templum *omni* argento *spoliavit*.

(*b*) Nihil est *morti* tam simile quam somnus.

TRANSLATION.

(*a*) He plundered the temple of Apollo of all the silver.

(*b*) Nothing is so like death as sleep.

PARSING.

omni—abl., sing., neut., adj. of 3rd decl., *omnis*, *omnis*, *omne*, agr. in gen. no. and case with 'argento.'

spoliavit—reg. trans. verb, act., indic., perf. def., 3rd pers. sing., agr. with (ille).

morti—dat., sing., fem., noun of 3rd decl., *mors*, *mortis*, gov. by the adj. of 'likeness,' 'simile.'

5. Translate into Latin :—

(*a*) Without air and sun animals cannot live.

(*b*) Many praise others that they may be praised by others.

TRANSLATION.

(*a*) Sine äere et sole animalia vivere non possunt.

(*b*) Multi alios laudant ut ab aliis laudentur.

END OF FOURTH YEAR.

FIRST PAPER.

(*Two Hours and a half allowed for this paper.*)

Dictation.

Wirte from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word 'Majestically.'

Write in small hand, as a specimen of copy-setting, the sentence, 'Wearing the white flower of a blameless life.'

Arithmetic.

MALES.

1. Goods are insured above their real value for £400, at 4½ per cent., so that in case of loss their real value and the premium may be recovered. What is their real value?

£104½ : £400 :: £100 : real value.

$$\frac{£100 \times 400}{104\frac{1}{2}} = \frac{80,000}{209} = \underline{£382\ 15s.\ 6\tfrac{8}{209}d.}\quad \text{Ans.}$$

2. A man drawing an income of £870 per annum from three per cent. stock, sells out at a profit of £1,450. What is the selling price of stock?

(*a*) £3 : £870 :: £100 : stock in 3 per cents.

$$\frac{£100 \times 870}{3} = £29,000$$

(*b*) £29,000 : (£29,000 + £1,450) :: £100 : price of stock.

$$\frac{£100 \times 30,450}{29,000} = \underline{£105.}\quad \text{Ans.}$$

FEMALES.

1. Explain the terms *rate per cent.*, *compound interest*, *discount*, *bankers' discount*, *present worth*.

Rate per cent. means the interest of £100 for a year.

Compound interest.—When the interest of money is added to the principal at certain periods, and afterwards interest is calculated on this amount, the interest accruing from this is compound.

Discount is a deduction made from a debt which is paid before it becomes due. Bankers, when discounting a bill, deduct the interest on the amount from the time of discounting till it becomes due. This discount, or banker's discount as it is called, is greater than the 'true discount' by the interest on the latter for the time that the bill has still to run. The sum left after deducting the discount is called the *present worth*. Present worth on a bill of £105, due a year hence, when money is rated at 5 per cent., is £100, £5 being the true discount. Banker's discount would be $\frac{£105 \times 5}{100} = £5\ 5s.$

2. Find the compound interest on £300 for 2 years at 3 per cent.

£3 per cent. gives $\frac{3}{100}$ of the principal as interest per annum.

3 per cent. = $\frac{3}{100}$	£300	= Principal for 1st year.
	9	= Interest ,, ,, ,,
	309	= Principal ,, 2nd ,,
	9·27	= Interest ,, ,, ,,
	318·27	= Amount ,, 2 years.
Deduct 1st principal	300	
	18·27	= Compound Interest.
	20	
	5·40	
	12	
	4·80	

∴ Compound Interest = £18 5s. 4⅘d. Ans.

3. If 7 oxen can eat 3 tons of hay in a month, how long will it take 49 sheep to eat 35 tons, an ox consuming 3 times as much as a sheep?

$$\left.\begin{matrix} 49 \text{ sheep} : (7 \text{ ox.} =)\ 21 \text{ sheep} \\ 3 \text{ tons} : 35 \text{ tons} \end{matrix}\right\} :: 1 \text{ month} : \text{time}$$

$$\frac{1 \text{ mo.} \times 21 \times 35}{49 \times 3} = \underline{5 \text{ months.}}\quad \text{Ans.}$$

4. Simplify :—

$$\frac{\frac{4}{9} \div \frac{5}{18}}{(\frac{3}{8} \text{ of } \frac{4}{9}) - (\frac{1}{2} \text{ of } \frac{3}{4} \text{ of } \frac{2}{21})}.$$

$$\frac{\frac{4}{9} \div \frac{5}{18}}{(\frac{3}{8} \text{ of } \frac{4}{9}) - (\frac{1}{2} \text{ of } \frac{3}{4} \text{ of } \frac{2}{21})} = \frac{\frac{4 \times 18}{9 \times 5}}{\frac{3 \times 4}{8 \times 9} - \frac{1 \times 3 \times 2}{2 \times 4 \times 21}}$$

$$= \frac{\frac{8}{5}}{\frac{1}{6} - \frac{1}{28}}$$

$$= \frac{8}{5} \div \left(\frac{14 - 3}{84}\right)$$

$$= \frac{8 \times 84}{5 \times 11}$$

$$= \frac{672}{55} = \underline{12\tfrac{12}{55}}.\quad \text{Ans.}$$

Grammar.

1. Analyse the following lines :—

'Is this a dagger which I see before me,
The *handle* toward my hand? Come, let me *clutch* thee.'
I have thee not, and yet I see thee still.
Art thou not fatal *vision*, sensible
To feeling as to sight?—or, art thou *but*
A *dagger* of the mind, a false *creation*,
Proceeding from the heat-oppressed brain?

Sentences	Kind	Connect.	Subject	Predicate	Object, &c.	Extensions
1. Is this a dagger, the handle towards my hand	Prin.		this	is a dagger (with) the handle....hand		
2. which I see before me	subord. adj. to I	which	I	see	which	before me (place)
3. Come (thou)	Prin.		(thou)	come		
let (thou) me (to) clutch the	Prin.	(and)	(thou)	let	me (direct) to clutch thee (indirect)	
4. I have thee not.	Prin.		I	have not	thee	
5. and yet I see thee still	subord. adv. (concession)	and yet	I	see	thee	still (time)
6. Art thou not fatal vision sensible to feeling	Prin.		thou fatal vision	art not sensible to feeling		
7. as (thou art sensible) to sight	subord. adv. (compar.)	as	(thou fatal vision)	(art sensible) to sight		
8. or art thou but a dagger of the mind, a false creation proceeding from the heat-oppressed brain	Prin.	or	thou	art but a dagger .....brain		

2. Parse fully the words in italics.

Handle—com. noun, neut., sing., obj., gov. by (with), (or nom. absolute 'being' understood).

(to) *clutch*—reg. trans. verb, act., infin., pres., gov. by let.

vision—abstr. noun, neut., sing., nom., agr. with 'thou,' or from being addressed.

but—adv., mod. the phrase 'art a dagger.'

dagger—com. noun, neut., sing., nom., after 'art,' in appos. with 'thou.'

creation—abstr. noun, neut., sing., nom., after 'art,' in appos. with 'thou' or 'dagger.'

3. Illustrate, by examples, the use of the parenthesis.

(*a*) He requested the young doctor, Balthasar (so he called Portia), might be permitted to plead.

(*b*) 'Yet tranquil now that man of crime
(As if the balmy evening time
Softened his spirit) looked and lay.'

(*c*) Antonio signed the bond, thinking it really was (as the Jew said) merely in sport.

4. Give examples of words derived from languages other than the Saxon and the classical.

ENGLISH WORDS FROM OTHER LANGUAGES.

Indian.—Bamboo, salaam, nabob, rajah, ayah.
Turkish.—Divan, sofa, fez.
Dutch.—Boom, block, sloop, skipper, yacht.
Arabic.—Algebra, alembic, almanac, fakir.
German.—Meerschaum, cobalt, feldspar, loafer.
Chinese.—Bohea, tea, junk, mandarin.
African.—Assegai, gorilla, kraal, zebra.

Euclid.

1. Write on Euclid's definition of parallel straight lines.

Parallel straight lines are such as are in the same plane, and which being produced ever so far both ways, do not meet.

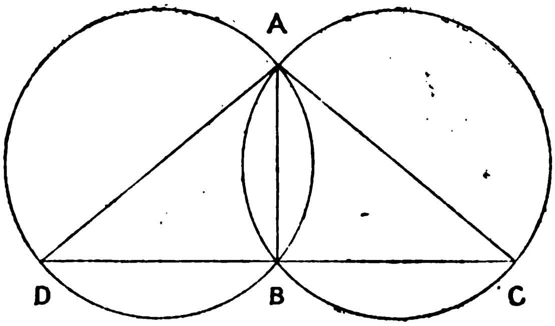
If a straight line fall on two parallel straight lines, it makes the alternate angles equal to one another, and the exterior angle equal to the interior and opposite angle on the same side; and also the two interior angles on the same side together equal to two right angles.

Euclid, Book I., Prop. 29.

2. The angle at the centre of a circle is double of the angle at the circumference on the same base that is on the same arc.

Euclid, Book III., Prop. 20.

3. Two equal circles intersect in A and B, and any straight line DBC is drawn through B to cut both circles. Prove that AC is equal to AD.



Let ADB, ACB be the two equal circles intersecting at A and B. Through B draw the straight line DBC. Join AD, AC, AD shall be equal to AC. Join AB. AB is a chord common to the two circles ADB, ACB, and therefore (III. 28) the arcs are equal, and therefore the angle ADB is equal to the angle ACB (III. 27.) That is, the angle ADC of the triangle DAC, is equal to the angle ACD, and therefore (I. 6) the side AD is equal to the side AC. Q. E. D.

Algebra.

1. Simplify :—

$$\tfrac{1}{6}[x(x+1)(x+2)+x(x-1)(x-2)]+\tfrac{2}{3}x(x-1)(x+1)$$

$$\tfrac{1}{6}[x(x+1)(x+2)+x(x-1)(x-2)]+\tfrac{2}{3}x(x-1)(x+1)=$$

$$\tfrac{1}{6}[x^3+2x^2+x^3+2x+x^3-2x^2-x^2+2x]+\frac{2x^3-2x}{3}$$

$$\tfrac{1}{6}(2x^3+4x)+\frac{2x^3}{3}-\frac{2x}{3}$$

$$\frac{x^3}{3}-\frac{2x}{3}+\frac{2x^3}{3}-\frac{2x}{3}=\underline{x^3.}\ \text{Ans.}$$

2. Extract the square root of :—

$$16a^4+81b^4-96a^3b-216ab^3+216a^2b^2$$

$$\begin{array}{l|l}
4a^2 & 16a^4-96a^3b+216a^2b^2+216ab^3+81b^4\,(\underline{4a^2-12ab+9b^2} \\
 & 16a^4 \\
\hline
8a^2-12ab & -96a^3b+216a^2b^2 \\
 & -96a^3b+144a^2b^2 \\
\hline
8a^2-24ab+9b^2 & 72a^2b^2+216ab^3+81b^4 \\
 & \underline{72a^2b^2+216ab^3+81b^4}
\end{array}$$

3. A party at an inn had a bill to pay among them, but two of them having slipped away, those who remained had each 5s. more to pay; how many were there at first?

$$\text{Let } x = \text{No. at first}$$

$$\text{then } \frac{200\text{s.}}{x} + 5\text{s.} = \frac{200\text{s.}}{x-2}$$

$$200x - 400 + 5x^2 - 10x = 200x.$$

$$5x^2 - 10x = 400$$

$$x^2 - 2x = 80$$

$$\text{Completing square } x^2 - 2x + 1 = 81$$

$$\text{Taking root } x - 1 = 9$$

$$x = 9 + 1 = \underline{10} = \text{No. at first. Ans.}$$

SECOND PAPER.

(*Three hours allowed for this paper.*)

Geography.

1. Draw a map of Central America.

2. Describe the principal currents of the Pacific Ocean.

One current, bearing away eastwardly, rounds Cape Horn and enters the Atlantic. Another curves north skirting the coasts of Chili and Peru, turns to the west, and merges into the *Great Equatorial Current* of the Pacific, the northern and southern branches of which hold on due west across the Pacific towards the East Indian Archipelago, but are separated by the *Equatorial Counter-Current* flowing in an exactly opposite direction.

The main portions of both the North and South Equatorial Currents have definite continuations, the former to the south as the *East Australian Current*, the latter to the north as the *Japan Current*.

The East Australian Current, after skirting the coast of New South Wales, turns east and finally merges into the north-easterly drift from the Antarctic Ocean.

The Japan Current, bending round the eastern coast of Japan, divides into a minor drift, setting north along the Kurile Islands, and ultimately finds its way through Behring's Strait into the Arctic Ocean. But the main portion sweeps along the Aleutian Islands, Alaska, and British Columbia, and then curves south, joining the northern branch of the Equatorial Current, having sent a minor branch along the shores of California and Mexico, forming the periodical *Mexican Current*.

3. Tell what you know about Honolulu, Jamaica, Chicago, Hayti, Buenos Ayres, and San Francisco.

Honolulu is the chief town and seaport of the Sandwich Islands on the south side of the island of Woahoo.

Jamaica is the largest and most valuable of the British West India Islands. It is 150 miles long by 40 miles in average breadth. It is traversed from east to west by mountains covered with majestic forests. The principal exports are sugar, rum, coffee, and spices. The capital is Kingston.

Chicago is a large city of the United States on Lake Michigan. A great portion of it was destroyed by fire in 1871. It is said to have made more rapid progress in wealth and inhabitants than any other city in the United States. Its population is over 500,000.

Hayti is, next to Cuba, the largest of the West India Islands. The west part of the island formerly belonged to France, but is now a negro republic with Cape Haytien for its capital; the east part formerly belonged to Spain, but it is now a republic with San Domingo for its capital.

Buenos Ayres is one of the states of the Argentine Republic, but is better known as the capital of the same name on the south shore of the Rio de la Plata. It was founded by the Spaniards, is well fortified, and a place of great trade.

San Francisco, or 'Frisco,' as the Americans like to call it, is a seaport, and the commercial metropolis of California, United States, on an extensive bay of the same name. It is the western terminus of the Pacific Railway, and a great starting place of steamers for Australia and New Zealand as well as for China and Japan.

History.

1. Name the leading men on each side in the Civil War. Give a brief account of *one* of them.

The leading men of the Royalists were Charles I., Prince Rupert, Sir Edward Hyde, Lord Falkland, Marquis of Montrose, and Colepepper.

Among the Parliamentarians were Cromwell, Earl of Essex, John Milton, John Hampden, Sir William Waller, Earl of Leven, Lord Fairfax, Earl of Manchester, Colonel Blake (afterwards Admiral), Sir Harry Vane, and Ireton.

CROMWELL.

Oliver Cromwell was born of a good family at Huntingdon, 1509. He had been twice returned to Parliament before 1640, in which year he represented Cambridge in the Long Parliament, when he was associated with Hampden, Pym, and others, and was one of the first to advocate resistance to the king's measures. In 1642 he received a captain's commission and raised a troop of horse in his native county. So well were his soldiers drilled, that, after Marston Moor, they got the name of Cromwell's Ironsides. At Naseby Cromwell commanded the right wing, and Ireton, his son-in-law, the left. Charles being totally defeated in this battle, ultimately gave himself up to the Scots. In 1649, when it was settled at his trial that Charles should be executed, Cromwell is said to have reluctantly given his assent, but when convinced of the necessity of Charles's death he does not seem to have hesitated about carrying the decision of the court into effect. After the execution Cromwell became a principal member of the council of state. He quelled a mutiny in the army, crossed the Irish sea and conquered Ireland, returned to make war on Prince Charles and the Scots, whom he defeated at Dunbar and Worcester. In 1653, he expelled the Long Parliament and was elected Protector of the Commonwealth, which office he held till his death in 1658.

2. Give a short account of Walpole's administration.

Walpole, assisted by Queen Caroline, began his administration in 1727, when he obtained a decided majority in the new Parliament. Spain made overtures for peace, and a quadruple alliance was established by which peace was maintained for ten years.

During this period, Walpole's skill preserved his power in Parliament in face of an opposition growing in numbers and ability, among whom the great William Pitt the elder made his appearance. In 1733 Walpole carried some important financial measures, but was obliged to withdraw his Excise Bill. He maintained the Septennial Act against all the force of the opposition, and his overwhelming majority in the election of 1735 caused the retirement of Bolingbroke to the continent. The following year was marked by the Porteous riots in Edinburgh. In 1738 differences arose with Spain about the boundaries of Georgia, the right of searching vessels at sea, and the ill treatment of British subjects. The king, the opposition and the people, dragged Walpole into the war which was declared in October 1739. Operations were commenced against the colonies of Spain, and Admiral Vernon took Portobello on the Isthmus of Darien. He failed, however, in a great combined attack on the strong fortress of Carthagena, 1741. The voyage of Anson round the world (1740—1744) arose from these campaigns. The disasters of the war completed the overthrow of Walpole. After the elections of 1741, and repeated defeats in the house he resigned; and died 1745.

Composition.

Write an essay on 'The influence for good or evil exerted by works of Fiction;' or, 'The best method of introducing a class to the study of Fractions.'

THE STUDY OF FRACTIONS.

Having drawn a line on the blackboard, divide it into two equal parts; then, after explanation and questioning on what has been done, get the children to see that the two together are equal to the whole.

Continue by dividing other things, such as apples or oranges, pieces of paper or string, and tell them that the two parts are called *halves*, each of them a *half*, and that two halves make a whole.

The next step in the process might be the division of the line into three equal parts, questioning the pupils in the same manner as before, getting them to see that three-thirds make up the whole. So we may go on with fourths, fifths, &c., till they have a true idea of the different parts, as two-thirds, three-fifths, &c., and how many halves, thirds, fourths, &c., in a whole.

Now may be introduced the expression for a fraction, and referring to the previous way of writing one-half, one-third, &c., show that $\frac{1}{2}$ means one something divided into two, $\frac{1}{3}$ one divided into three, $\frac{1}{4}$ divided into four equal parts. Let them now see that the figure below the line shows into how many parts the object or the line was divided, and the figure above how many of these parts were taken.

We have now reached the stage at which the definition may be given; namely, that 'a fraction (broken part) is a part of a whole,' and then repeat the names of the various fractions given above.

By this time they will begin to know that if $\frac{1}{4}$ be taken from a whole $\frac{3}{4}$ will be left; if $\frac{2}{3}$ be taken from anything, $\frac{1}{3}$ will be left, &c.

Latin.

THIRD STAGE.

(*The answers to be written on a separate paper.*)

1. Translate into English :—

(*a*) His responsis ad Cæsarem relatis iterum ad eum Cæsar legatos cum his mandatis mittit: Quoniam tanto suo populique Romani beneficio affectus, quum in consulatu suo rex atque amicus a senatu appellatus esset, hanc sibi populoque Romano gratiam *referret*, ut in colloquium venire invitatus gravaretur neque de communi re *dicendum* sibi et cognoscendum putaret, haec esse, quae ab eo postularet.

(*b*) Ipse interim in colle medio triplicem aciem instruxit legionum quatuor veteranorum; sed in *summo* jugo duas legiones quas in Gallia citeriore proxime conscripserat, et omnia auxilia collocari ac totum montem hominibus compleri et interea sarcinas in unum locum conferri et eum ab his, qui in superiore acie *constiterunt* muniri jussit.

TRANSLATION.

(*a*) These answers being brought to Cæsar, Cæsar a second time sends ambassadors to him with these instructions: That whereas after being treated with so much kindness on his own part and that of the Roman people, since in his own consulship he had been styled king and friend by the senate, he was making such a return as this to himself and the Roman people as that he should, when invited to come to a conference, make a difficulty about it and think that it was not incumbent upon him to become thoroughly acquainted with an affair of common interest; that these were the things which he had to ask from him.

(*b*) He himself, meantime, drew up on the middle of the hill a triple line of four veteran legions; but he ordered the two legions which he had levied in hither Gaul to be posted on the summit of the hill and all the auxiliaries, and all the mountain to be filled with men, and in the meantime the baggage to be collected into one place and that it be guarded by those who stood posted in the upper line.

2. Parse fully the words printed in italics in the above passages.

What is the construction of subordinate clauses after verbs of feeling and declaring? When may 'that' be translated by 'ut?'

Translate into Latin :—

(*a*) The captives will be bound by the soldiers, and the city will be destroyed by fire.

(*b*) The king pardoned the slave, and promised to set him free.

(*c*) We have come to bury Cæsar, not to praise him.

PARSING.

Referret—irreg. trans. verb, act., 3rd conj. (*refero—tuli—latum—ferre*), subj., imperf., 3rd, sing., agr. with 'is.'

dicendum—trans. verb, pass., gerundive, 3rd conj. (*dico, dixi, dictum, dicere*), agr. with 'cum.'

summo—abl., sing., neut., adj., 1st and 2nd decl. (*summus—a—um*), superl. deg. of superus, superior, supremus, or summus.

Constiterunt—trans. verb, act., 3rd conj. [illegible] *stitum—sistere*), indic., perf., 3rd pers., plur., agr. with 'qui.'

Verbs of feeling and declaring are followed in subordinate clause by the accusative with the infinitive.

Verbs denoting the outward expression of feeling are often followed by 'quod,' and those that express wishing, especially 'opto,' by 'ut.'

'That' is to be translated by 'ut' when it means 'in order that,' 'granting that,' or 'so that;' and also after such words and phrases as, Contingit, evenit, accidit, reliquum est, &c., mos est, jus est, &c.

TRANSLATION.

(*a*) Capti a militibus vincientur, et urbs igne comburetur.

(*b*) Rex veniam servo dedit, et se eum liberaturum promisit.

(*c*) Ut Cæsarem sepeliamus, ne eum laudemus, venimus.

Needlework.

FIRST YEAR.—Knit the heel of a sock suitably for a boy of ten.

Sew on a tape and button on a band of calico.

SECOND YEAR.—Fix and work a hem six inches in length.

Fix and run three tucks.

THIRD YEAR.—Darn a hole one inch square on a stocking web material. (Common method.)

FOURTH YEAR.—Darn on coarse linen a diagonal cut half an inch long.

* * *

Publications Received.

Bell, G., and Sons—

Examples in Arithmetic. By C. Pendlebury, M.A.
Barnett's Notes on King Henry V.
Arithmetic. By C. Pendlebury, M.A.
Bell's Reading Books: The Talisman; Life of Columbus.
The Ajax of Sophocles, with Notes. By F. A. Paley, M.A., LL.D.
The Schoolmaster's Calendar. 1888.

Blackie and Son—

Poynter's Drawing for the Standards. Books 11, 16, 21, 22.

Cassell and Co., Limited—

Cassell's Higher Class Readers :—
- The World's Lumber Room.
- Short Studies from Nature.
- A Ramble round France.
- All the Russias.
- Chats about Germany.
- The Land of the Pyramids.
- The Eastern Wonderland.
- The Land of Temples.
- Peeps into China.
- Glimpses of South America.
- Round Africa.
- The Isles of the Pacific.

Chambers, W. and R.—

The Standard Algebra. Part I.
Lives of Good and Great Women.

Curwen, J., and Son—

School Cantata: The Armada. By A. J. Foxwell.
" " Life at Sea. By T. M. Pattison.
The Musical Inspection; How to Prepare for it.
The Tonic Sol-Fa Reporter. March.

Gill, G., and Sons—

Guide to the Scholarship Examination. By Benson Clough.

Heywood, John—

The Premier Table Book.
[illegible] by the Rev. [illegible]
The Junior Church Catechism. By M. T. Yates.

Isbister, W., Limited—
Natural History Object Lessons. By G. Ricks, B.Sc.

Longmans and Co.—
Social Habitations, &c. By the Rev. J. G. Wood.
Heroes of the Arctic Regions. By Dr. Hartwig.
Wonders of the Tropical Forests. By Dr. Hartwig.
Prosperity or Pauperism? By the Earl of Meath.
Commercial Précis-Writing. By the Rev. T. Hunter, M.A.

Nelson, T., and Sons—
The Great Events of History (Royal Upper Class Readers).

Relfe Bros.—
First Principles of Modern History. By J. S. Taylor.
How to Spell and Speak English.
Notes on the Church Catechism. By the Rev. A. Towsey,
Dates made Easy. By J. Hugh Hawley.
M.A.

Smith, Elder and Co.—
The Cornhill Magazine. March and April.

Swan Sonnenschein and Co.—
The Cyclopædia of Education. Parts II. and III.
A First History of the English People. Vols. 1 and 2. By Amy Baker.

The Clarendon Press—
Geometry in Space. By R. C. J. Nixon, M.A.

The National Society's Depository—
The National Test Cards. Standards I. to VII.

Whittaker and Co.—
Whittaker's French Series:—
Galland's Ali Baba. By Emile Clare.
Scribe's Le Verre d'Eau. By A. Barrère.
Piron's La Métromanie. By Leon Delbos.
Intermediate German Course. By F. Lange.
Doktor Wespe (Benedix). By F. Lange.

Query Column.

RULES.

1. Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

*** All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.*

General.

1. FORLORN.—Of the capitals nearly all the letters are of the wrong shape. The remedy is to buy a good copy book and practice. If you have read this column in past months you will have learned what to do. In regard to some of the numbered letters there is little choice. Some you have put in the small hand are only small editions of large hand, while some of those in the large hand are small hand letters 'writ large.'

2. L. M. N.—We think you have the best edition. You only want portions of it, the whole is rarely read. For your own reference let us call your attention to Saintsbury's 'History of Elizabethan Literature,' one volume. It contains a criticism upon the work you name. There are also references in Angus' 'English Literature' and Morley's 'First Sketch of English Literature.'

3. N. G.—We really cannot say. It might do so if it were a very bad performance. We think, however, that you could hardly do wrong to wait a year, and in the meantime try to improve upon the last effort. You would also be better prepared for the examination itself.

4. BOG.—You order your book through a bookseller. He may not know the publisher, but when his order reaches his London agent he will know in most cases where to get the books from. Don't trouble about that; merely order. If there are two booksellers in the town, sharpen the dull one by ordering your books of the one who gets what you ask without pestering you with too many questions. If you had to come to London and buy your books what you ask might be serviceable, but we assure you that if you gave the London collector all the details you mention you would hinder, not help him. The price is another matter. No doubt that is convenient to know. The books, however, are none of them very dear, and one cannot always verify the price without great trouble. Pestalozzi; yes to both questions. In theoretical music only.

5. G. H.—We must verify your question first.

6. JET.—We do not remember receiving your queries before. (*a*) Latin—sufficient. (*b*) French—sufficient. We presume your edition of 'Arnold' is a recent one by Bradley. Macmillan's 'Progressive French Course,' Part III., contains excellent material for French composition. We have but one piece of advice to give you, and that is, write your exercises carefully, have them corrected and understand why they are altered, and profit by the emendations. Merely writing exercises is no use. In regard to 'Comus' you can use the Clarendon Press edition, and so of the others.

7. CONSTANT SUBSCRIBER.—You can write to the Secretary of the Royal Geographical Society, Burlington House, Piccadilly, W. He will, if you ask him, send you a form of application and the other information you require.

8. TOMMY.—We think the matriculation would be far the best for you if you could do it. It would, however, take you longer than the other examination you name. Make your selection, and then write to the secretary, and get the new syllabus. Having done that we will give you any advice we can upon the best and shortest course to take.

9. TAU.—For the same reason that it would be sufficient to cover it with a sheet of wire gauze.

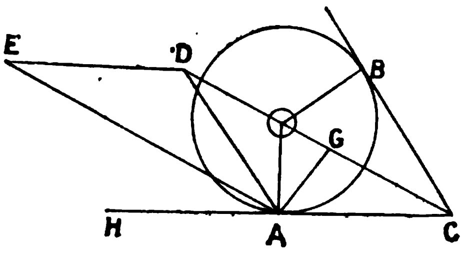
10. HELENA.—You may judge whether a word is likely to be of Latin origin by its prefix or suffix. Further, you can remember that no article, pronoun (except one), and few propositions or conjunctions are of Latin origin. In case the word came to us through the French, the termination would often give evidence of it.

11. L. M.—You will not be able to obtain a parchment by service in the school you name. You can only do that by serving in a school which is inspected by one of Her Majesty's Inspectors. The second part of your query is therefore disposed of at the same time.

12. ———.—You could not do better than study the articles now passing through this magazine upon Pestalozzi.

13. HAUGHTON'S MECHANICS.—We will refer to the book and look at the question and give you our opinion next month.

14. MAGISTER.—(*a*) If a particle moves uniformly in a circle with speed v, what is its change of velocity after it has described an arc of 120°.



We have not been able to find the book you quote from. But the phraseology indicates that velocity is used in the new meaning of a vector or directed quantity. The velocity of the particle is constant in amount but varying in direction. The question really means what velocity added to the original velocity will give the final velocity. Let us call AC the initial velocity in magnitude and direction. Then the angle AOB = 120 and the final velocity is in the direction CB or AD, and its magnitude is the same as at first (the speed being uniform), it has only changed in direction. AC is a component velocity and AD is the resultant velocity, what is the other component? Join CD, through D draw DE parallel to CA, and through A draw AF parallel to CD; we have to determine AF in magnitude and direction. In magnitude AF = CD. Draw AG perpendicular to CD; then since AOB = 120° and the angles CAO and CBO are right angles, the angle ACB = 60°, but as CB and CA are tangents and O is the centre of the circle the angle ACB is bisected.

Hence the triangle ACG is half an equilateral triangle, and

$\therefore$ the altitude $\text{CG} = \dfrac{\sqrt{3}}{2}\,\text{AC}$.

But since AC = AD the perpendicular AC bisects CD,

$\therefore \text{CD} = 2 \times \dfrac{\sqrt{3}}{2}\,\text{AC}$.

But CD is the added velocity and if AC the initial velocity = v

$$\text{CD} = \sqrt{3}\,v.$$

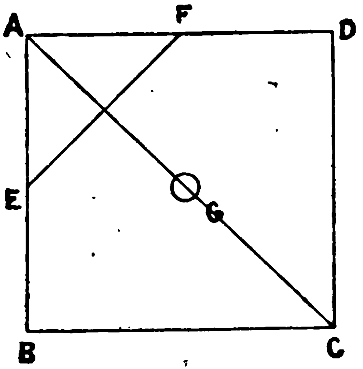
For the direction of CD we must determine the angle CAF.

Now AF was drawn parallel to CD and we have shown that the angle ACG is 30°.

$\therefore$ The angle FAH is 30°,

$\therefore$ The angle CAF is 180 − 30 = 150°.

(*b*) From a square a portion is cut off by a line passing through the middle points of two adjacent sides. Find the centre of gravity of the remainder.



Let ABCD be the square, O the centre of gravity, G the centre of gravity of the remainder, then let the corner A be cut off; join AC.

The piece cut off, AEF, is evidently $\frac{1}{8}$ of the square; the centre of gravity of AEF is K which is $\frac{2}{3}$ of AH and $\therefore \frac{1}{3}$ AO.

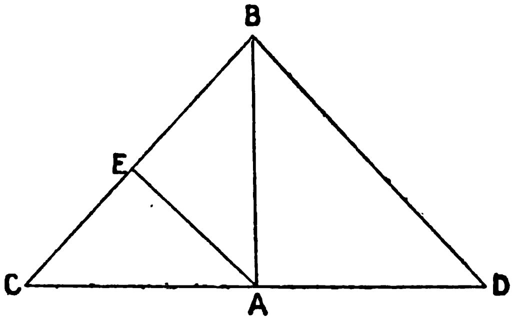
Let AO be unity and $\dfrac{\text{OG}}{\text{AO}}$ or $\dfrac{\text{OG}}{\text{OC}} = x$.

Then taking moments about A we have

$$\tfrac{1}{8} \times \tfrac{1}{3} + \tfrac{7}{8}(1 + x) = \tfrac{8}{8} \times 1$$
$$\tfrac{1}{24} + \tfrac{7}{8} + \tfrac{7}{8}x = 1$$
$$\tfrac{7}{8}x = 1 - \tfrac{7}{8} - \tfrac{1}{24} = \tfrac{2}{24}$$
$$\therefore x = \tfrac{2}{24} \times \tfrac{8}{7} = \tfrac{2}{21}.$$

15. J. W. DUCK.—Jevon's 'Logic,' 1s.; Curtis' 'Dates,' 1s.; Capel's 'Catch Questions,' 4s. 6d.; Justin Macarthy's 'History,' 6s.; 'Julius Cæsar' (Wright), *not* interleaved, 1s. 6d.; Macaulay's 'Addison' and 'Milton,' 6d. each.

16. JEAN.—A spar of uniform section of length l, and weight w, has an end pivoted in the ground, and is stayed in a position inclined to the vertical by two ropes, each of length b, attached to it at a distance c from the pivoted end, and attached to their other extremities to rings fastened in the ground, each at a distance a from the pivot, and in directions which contain an angle θ at the pivot. Find an expression for the tension in each rope.



Let AB represent portion of spar (c), BC, BD the ropes (b), and AC, AD = a. In the triangles BAC, BAD, the three sides are equal, therefore angle BAC = angle BAD, wherefore it is evident that AB is perpendicular to CD, and *not* inclined to the vertical.

Draw AE perpendicular to BC.

Then, Tension in BC × AE = $\frac{1}{2}w$;

By similar triangles AEC, BAC,

$$\frac{\text{AE}}{\text{AC}} = \frac{\text{BA}}{\text{BC}},$$
$$\therefore \text{AE} = \frac{\text{BA} \times \text{AC}}{\text{BC}}$$
$$= \frac{c \times a}{b};$$
$$\text{Tension in BC} \times \frac{ac}{b} = \tfrac{1}{2}w,$$
$$\therefore \text{Tension in each rope} = \tfrac{1}{2}w \times \frac{b}{ac}$$
$$= \tfrac{1}{2}\frac{bw}{ac}.$$

Algebra.

1. MYNNYDOG.—What is meant by the radix of a scale of notation? Prove the rule for square root.

The radix of a scale of notation is the base of a system of numbers.

Since $(a + b)^2 = a^2 + 2ab + b^2$, therefore $a + b$ is the square root of $a^2 + 2ab + b^2$, and from this the rule for the extraction of the square root may be obtained.

$$\begin{array}{r|l} & a^2 + 2ab + b^2\,(a + b \\ & a^2 \\ \hline 2a + b & 2ab + b^2 \\ & \underline{2ab + b^2} \end{array}$$

Take the square root of 1849.

$$\begin{array}{r|l} & \quad\;\; a \quad\; b \\ & 1849\,(40 + 3 \\ a^2 = & 1600 \\ \hline 80 + 3 & 249 \\ (2a + b & \underline{249} = 2ab + b^2 \end{array}$$

The ciphers may be omitted for the sake of brevity.

$$\begin{array}{r|l} & 1849\,(43 \\ & 16 \\ \hline 83 & 249 \\ & \underline{249} \end{array}$$

2. M.H.—A boy saves 1½d. one week, 3d. the next, 4½d. the next, and so on; how long will he be accumulating £111 0s. 9d. in this manner?

This is a question in Arithmetical Progression, where sum = £111 0s. 9d., first term = 1½d., difference = 1½d., and number of terms is required.

$$\left.\begin{array}{r} \text{Sum} = 53{,}298 \text{ half-pence} \\ \text{First term} = 3 \text{ half-pence} \\ \text{Difference} = 3 \quad\text{,,}\quad \end{array}\right\}$$

$$S = \left\{2a + (n-1)\,d\right\}\frac{n}{2}$$

$$\therefore\ 53{,}298 = \left\{6 + 3\,(n-1)\right\} \times \frac{n}{2}$$

$$= (6 + 3n - 3) \times \frac{n}{2}$$

$$106{,}596 = n\,(3n+3)$$

$$35{,}532 = n\,(n+1)$$

$$n^2 + n = 35{,}532$$

$$n^2 + n + (\tfrac{1}{2})^2 = 35{,}532 + \tfrac{1}{4}$$

$$= \tfrac{142129}{4}$$

$$n + \tfrac{1}{2} = \pm\,\tfrac{377}{2}$$

$$\therefore\ n = \pm\,\tfrac{377}{2} - \tfrac{1}{2}$$

$$= 188, \text{ or } -189.$$

$$\therefore\ \text{Time} = 188 \text{ weeks}$$

$$= \underline{3 \text{ years } 32 \text{ weeks.}} \quad \text{Ans.}$$

3. ALPHA.—Solve:—

$$\frac{2 + 6y - 4x}{3z - 4} = \frac{4 + 5z - x}{2y - 3z - 1} = \frac{y - 2z - 1}{1 + 3y - 2x} = 1.$$

(*College of Preceptors*, 1882.)

$$(1) \qquad \frac{2 + 6y - 4x}{3z - 4} = 1$$

$$2 + 6y - 4x = 3z - 4.$$

$$-4x + 6y - 3z = -4 - 2$$

$$4x - 6y + 3z = 6.$$

$$(2) \qquad \frac{4 + 5z - x}{2y - 3z - 1} = 1$$

$$4 + 5z - x = 2y - 3z - 1$$

$$-x - 2y + 5z + 3z = -1 - 4$$

$$x + 2y - 8z = 5.$$

$$(3) \qquad \frac{y - 2z - 1}{1 + 3y - 2x} = 1$$

$$y - 2z - 1 = 1 + 3y - 2x$$

$$2x + y - 3y - 2z = 1 + 1$$

$$2x - 2y - 2z = 2$$

$$x - y - z = 1.$$

$$\left.\begin{array}{l} (2)\ x + 2y - 8z = 5 \\ (3)\ \underline{x - \ y - \ z = 1} \end{array}\right\}$$

$$\text{Subtracting]}\quad 3y - 7z = 4. \quad (4)$$

$$\left.\begin{array}{l} (1)\ 4x - 6y + 3z = 6 \\ (3)\ \underline{4x - 4y - 4z = 4} \end{array}\right\}$$

$$\text{Subtracting]}\quad -2y + 7z = 2. \quad (5)$$

$$\left.\begin{array}{l} (4)\quad\ \ 3y - 7z = 4 \\ (5)\ \underline{-2y + 7z = 2} \end{array}\right\}$$

$$\text{Adding]}\quad \therefore\ y = 6.$$

$$(5)\ -2y + 7z = 2$$

$$7z = 2 + 12$$

$$= 14$$

$$\therefore\ z = 2.$$

$$(3)\ x - y - z = 1$$

$$x = 1 + 6 + 2$$

$$\therefore\ x = 9.$$

$$\therefore\ \underline{x = 9, y = 6, z = 2.} \quad \text{Ans.}$$

Arithmetic.

1. DAFFODIL.—In a school $\frac{2}{5}$ of the number on the register are boys, $\frac{3}{10}$ girls, and 120 infants. How many boys and girls are there?

$$\text{Part infants} = 1 - (\tfrac{2}{5} + \tfrac{3}{10})$$

$$= 1 - \frac{4+3}{10}$$

$$= 1 - \tfrac{7}{10}$$

$$= \tfrac{3}{10};$$

$$\tfrac{3}{10} \text{ of scholars} = 120,$$

$$\therefore\ \text{No. of scholars} = \overset{40}{\cancel{120}} \times \frac{10}{\cancel{3}}$$

$$= 400;$$

$$\left.\begin{array}{r} \text{No. of boys} = \tfrac{2}{5} \text{ of } 400 = 160 \\ \text{,,}\quad \text{girls} = \tfrac{3}{10} \text{ of } 400 = 120 \end{array}\right\} \text{Ans.}$$

Mensuration.

1. MATER.—A rectangle is 5 times as long as it is broad, and its area is 405 sq. yds.; find its perimeter. (*Senior's* 'My first Mensuration.')

$$\text{Length} \times \text{Breadth} = \text{Area};$$

$$5 \text{ times Breadth} \times \text{Breadth} = 405 \text{ sq. yds.},$$

$$5 \text{ times Breadth}^2 = 405 \text{ sq. yds.},$$

$$\text{Breadth}^2 = 81 \text{ sq. yds.},$$

$$\therefore\ \text{Breadth} = 9 \text{ yds.}$$

$$\therefore\ \text{Perimeter} = 2\,(45 + 9) \text{ yds.}$$

$$= (54 \times 2) \text{ yds.}$$

$$= \underline{108 \text{ yds.}} \quad \text{Ans.}$$

——o——

Pupil Teachers' Preparation Papers.

A GOODLY number of pupil teachers of all years and of both sexes availed themselves of our offer to examine their answers to the Test Paper in our March number. These answers were all returned on the 20th March, so that nearly five weeks would elapse from that date to the Government examination. The papers were of all kinds—good, bad, and indifferent; and we would now draw attention to the chief faults in them for the benefit of all who are to be examined.

A common fault was—*Inattention to the directions given*. For example: three sums were asked for, yet quite frequently four were attempted. All work done beyond what is required is absolutely thrown away. The maximum of marks can be obtained by doing what is required. If more is attempted valuable time which might be given to other subjects is wasted, and marks are lost.

Another common fault was—*Making answers too long*. Several pupil teachers gave answers to one question covering two or even three pages of foolscap. The consequence was that a second or third answer was compressed into three or four lines. Two or three answers of average length would obtain many more marks than one very long one, and two very short ones. Remember that a scale of marks is supplied to every inspector, the maximum for each question being given. That scale was adopted by our examiners for the Test Paper, and those who forwarded them will be able to see how the tests are applied by the inspectors.

Most attention needs to be paid to Grammar, and especially to Parsing and Analysis. Even with third and fourth year teachers it was quite a common mistake to find a participle alone as a predicate, and while a word was put into the *object* in analysis it was said to be nominative case in the parsing. If the parsing is given as one question it almost invariably carries double the marks of any other question in the subject. The greatest care, therefore, should be taken with it.

Closely allied with this subject, and reckoned along with it as a failing subject, is that of Composition. This, on the whole, was well done, but many pupil teachers *punctuate badly*. A precise and concise style should be attempted. Do not try to make long, involved sentences, but when once you have said a thing come to a full stop, and begin another sentence.

In Arithmetic the definitions were poor. To avoid this *definitions should be committed to memory*. The question which asks for a definition or which asks for a process to be given or explained is worth ten more marks than any other. The map in Geography is also most valuable, whereas it is nearly always done worse than either of the other questions. Meridians and parallels are worthless unless numbered, and if not numbered correctly they had better be left out altogether.

Great complaints have been made about *want of time* to answer the questions. There is a great deal to be done in the time allotted, but if teachers have worked steadily all through the year, and will do just what they are told and avoid prolixity, they will generally be able to obtain full marks.

Read carefully the hints given in the previous numbers of the PRACTICAL TEACHER, as well as this paper, and if you have worked steadily during the year, and keep these precepts in mind, success will attend your trial on the 21st inst.

Bearing in mind what has been said about the value of certain questions, so far as written work goes, the following may be taken as the scale of marks in use. We should advise all pupil teachers to make a copy of it for future reference, and especially that part which deals with the full examination.

Arithmetic—(four questions given, three to be done), 30, 30, 30 and 40 marks. *Grammar* (four or five questions given, three to be done), as a rule 20 for each answer, except one, which has 40. *Geography* (four given, three required), 25, 25, 25, 30. *History*, the same as Geography. *Euclid* (three given—two wanted), 20, 20, 30. *Algebra*, the same as Euclid. *Mensuration* (two given, one wanted), 20, 20. *School Management* or *Teaching* (four, five or six given, two wanted), each worth 20. *Music* (three given and wanted), 13, 13, 14.

Any teacher under examination may thus be able to estimate roughly the marks obtained, if sure that the answers are good ones. But other considerations apply when the earning of the 40s. or 60s. is concerned. Unless 40 per cent. of the marks be obtained in every subject except Geography, History, and Music, no grant at all can be earned. Fifty per cent. of *all* the marks obtainable will earn the 40s. grant, and 75 per cent. the 60s. grant. For the purpose of reckoning, the subjects bracketed below are considered together as one subject.

EDUCATION DEPARTMENT'S SCALE OF MAXIMUM MARKS FOR PUPIL TEACHERS AND CANDIDATES.

		Total.
Reading	45	90
Recitation	45	
Handwriting (judged by all the papers) ...	40	80
Spelling (ditto)	40	
Arithmetic		100
Grammar	80	120
Composition (all papers)	40	
Geography		80
History		80
Mathematics:		
Euclid	50	120
Algebra	50	
Mensuration	20	
Music		40
Needlework:		
Garments at home	30	90
Work at Examination	60	
Teaching:		
Practical skill (shown in school)	80	120
Knowledge of method (paper work)	40	

A male pupil teacher may thus get 830 marks, and a female pupil teacher 800 marks. Less than 35 per cent. of this total involves a warning that failure to the same extent next year will prevent the recognition of the pupil teacher as part of the school staff. Less than 35 per cent. in any subject will involve a warning (a * or ° against the name of the pupil teacher in the annual report on the school), while if less than 50 per cent. the pupil teacher will be cautioned, that is, the subject will be placed opposite his name in the report. All pupil teachers should try to take the music paper, as the 40 marks for that subject are included in the totals to be obtained. The totals for first and second year male teachers are less than for the others, because in the one case they do not take Mathematics and School Management, and in the other they do not take Algebra and Mensuration.

Below we print a half-yearly Test Paper for the October teachers. We repeat the offer made last month, and will examine and return postage paid any set of them which reaches us by the 10th inst.

TEST PAPER FOR PUPIL TEACHERS WHO ARE TO BE EXAMINED IN OCTOBER.

[NOTE: This paper covers half the work of the year, and is designed to test the accuracy of the previous six months' work. It is similar to the papers which the writer has set for many years to one of the largest Pupil Teacher Examination Associations in the country. *No pupil teacher should omit to try it.*]

Directions.

1. Write on half sheets of foolscap, and on one side only.
2. At the top of each half sheet write your name in full; also the full name of your school, and the year whose papers you are answering.
3. Do not write the questions, but prefix to each answer the number of the question to which it corresponds.
4. Do not use any book or writing from which answers may be copied.
5. If you have not time to answer all the questions in any subject, choose those you can answer the best; but do not omit the whole of any one subject.
6. Keep strictly to the time allowed.

END OF FIRST YEAR.

Three and a half hours allowed.

Arithmetic.

(*Do three sums only.*)

MALES.

1. What is meant by an improper fraction? Give names to each of the following fractions:—$\frac{7}{10}$, $5\frac{1}{6}$, $\frac{11}{7}$, $\frac{3\frac{1}{4}}{7\frac{1}{4}}$, $\frac{5}{8}$ of $3\frac{1}{2}$ of $7\frac{1}{4}$. (30)

2. Find the L. C. M. of 4, 9, 10, 15, 21, 18, and 20; and the G. C. M. of 1,020 and 6,630. What is meant by the Greatest Common Measure and the Least Common Multiple? (40)

3. $7\frac{2}{5}$ of $365\frac{1}{4}$ days + $3\frac{9}{10}$ of $\frac{5}{6}$ week + $\frac{3}{4}$ of $5\frac{3}{8}$ hours − $\frac{1}{8}$ of 6,339 days 30 minutes. (30)

4. What fraction of 2 miles 1 fur. 36 poles 3 yds. is 2 fur. 15 poles $2\frac{1}{2}$ yds.?

FEMALES.

1. Find the cost of 1,456 articles at 14s. $6\frac{1}{2}$d. each. (30)

2. $232\frac{9}{13}$ articles at £418 4s. $1\frac{3}{4}$d. each. (35)

3. Find the value of 1 lb. 1 oz. 10 dwts. at £1,178 16s. 8d. per lb. (30)

4. Make out and receipt the following bill:—3 lbs. tea at 3s. $2\frac{1}{4}$d. per lb., 20 lbs. of biscuits at $10\frac{1}{4}$d. per lb., 5 stone and 2 lbs. best tea at 3s. $1\frac{3}{4}$d. per lb., 6 lbs. green tea at 4s. $1\frac{1}{4}$d. per lb., $1\frac{1}{4}$ stones of flour at 1s. 8d. per stone.

Geography.

MALES AND FEMALES.

(*Answer three questions only.*)

1. Draw a full map of England south of the Thames, Ulster, or Wales. Insert parallels if you can. (30)

2. Name the principal towns in England and Scotland engaged in the cotton, woollen, and iron trade. (25)

3. Say what you can briefly of Aberdeen, Ben Nevis, Bala, Neagh, Limerick, Valentia, Bristol, St. Helen's, Middlesborough, Wrekin. (25)

4. Name the foreign possessions of Britain. (25)

Grammar.

(*Answer Questions 1 and 2, and one other question.*)

1. The western waves of ebbing day
Rolled o'er the glen their level way,
Each purple peak, each flinty spire,
Was bathed in floods of living fire.
A summer night in greenwood spent
Were but to-morrow's merriment. *Scott.*

Analyse these six lines. (25)

2. Parse the last two lines. (35)

3. Give six examples of the ordinary terminations of English nouns. (20)

4. How do you distinguish transitive and intransitive verbs? What is meant by *voice* applied to verbs? Write a sentence in the active voice, and one in the passive voice. (20)

Composition.

(*Read the following once only, and then write it from memory.*)

One of the most stoutly defended places on the field of Waterloo was a farmhouse with an orchard surrounded by a thick hedge. Our soldiers were told to hold it against the enemy at any hazard and any sacrifice. The French were beaten back many times, but at last the powder and ball were running short, the hedges had taken fire, and the orchard was surrounded by a ring of flame. A messenger had been sent for more ammunition, and soon two loaded waggons neared the spot. The driver of the first, with the reckless daring of an English boy, spurred his horses through the burning hedge, but the flames caught the powder, and in an instant horses, waggon and driver were blown into fragments. The second driver was appalled, but seeing that the shock had beaten the flames back, he dashed his horses at the breach, and amid the deafening cheers of the garrison landed his terrible cargo safe within. The Duke of Wellington is said to have spoken of this as one of the bravest deeds of the whole battle. (40)

History.

(*Answer three questions only.*)

1. What means did the Romans take to keep back their enemies in the north of Britain? Give dates. (25)

2. Who were Julius Agricola, Caractacus, Boadicea, and Egbert? (25)

3. How did the Saxons divide Britain after they had conquered it? Draw a rough sketch map showing the position of these divisions if you can. (30)

4. Write a short account of the condition of the people of Britain before and at the close of the Roman occupation of Britain. (25)

END OF SECOND YEAR.

FIRST PAPER.

(*Three and a half hours allowed.*)

Euclid.

MALES.

(*Answer two questions, including Question 3, if you can.*)

1. Upon the same base and on the same side of it there cannot be two triangles having their two sides terminated in one extremity of the base equal to one another and likewise those terminated in the other extremity. (20)

2. If two straight lines cut one another, the vertical or opposite angles are equal to one another. (20)

3. Given two points one on each side of a given line; find a point in the line such that the angle contained by two lines from it to the given points may be bisected by the given line. (30)

Arithmetic.

MALES.

(*Do three sums only.*)

1. What is interest? What is the difference between the simple and compound interest of £450 for $2\frac{1}{2}$ yrs. at 4 per cent. per annum? (40)

2. Oranges are bought at 2·5 shillings for 40. What must I sell a dozen of them at, so as to gain ·25d. on each orange? (30)

3. If £781 put out on loan produce £16 5s. 5d. in 5 months, how much interest will £589 produce in 8 months at the same rate?

4. What principal will produce £8 6s. 6d. in 2 yrs. 6 months at 4 per cent. per annum?

FEMALES.

Answer the questions set for First Year Males.

Grammar.

MALES AND FEMALES.

(*Answer Questions 1 and 2, and one other question.*)

1. Ah, *none but* in this *iron* age would do it!
The iron of itself though *heat red-hot*
Approaching near these eyes would drink my tears,
And quench his fiery indignation
Even in the matter of *mine innocence*;
Nay, after that *consume* away in rust,
But for *containing fire to harm* mine *eye*.
Shakespeare.

Analyse lines 2 to 7. (20)

2. Parse the words in italics. (40)

3. Write the meaning of the above passage in your own words. (20)

4. What are auxiliary verbs and participles? Give the different uses of all the auxiliary verbs. (20)

Geography.

(*Answer three questions only.*)

1. Draw a full map of France or Italy, or a map of the Mediterranean or the Baltic Sea, showing the rivers which empty themselves into them, and the ports on their shores. (30)

2. Describe the surface of Europe. (25)

3. Name in order the ten largest towns in Europe, and say for what each is noted, and where it is situated. (25)

4. Compare the physical features of Scandinavia and Holland.

SECOND PAPER.

(*Two and a half hours allowed.*)

History.

(*Answer three questions only.*)

1. Write an account of the reign of King John. (25)

2. State all you know of the decline of the power of the king and the increase of the power of the people during the Norman and Plantagenet period of English History. (30)

3. Describe the conquest of Wales, or the attempt to gain possession of Scotland by Edward I. (25)

4. Say all you can of the subjugation of Ireland in the twelfth century. (25)

Teaching.

(*Answer two questions only.*)

1. Explain briefly, as to a class, the meaning of the following passage:—

> How in the noon of night that pibroch thrills,
> Savage and shrill! but with the breath which fills
> Their mountain pipes, so fill the mountaineers
> With the fierce native daring which instils
> The stirring memory of a thousand years:
> And Evan's, Donald's fame rings in each clansman's ears.

(20)

2. Why should a teacher read to his class? Write the verbal orders you have to give to maintain discipline during your reading lesson. (20)

3. What are the qualities of good reading? (20)

4. Write a specimen of a copy in large hand and a copy in small hand for the blackboard. To what points in the copies would you specially draw the attention of the children? (20)

END OF THIRD YEAR.

FIRST PAPER.

(*Three and a half hours allowed.*)

Euclid.

MALES ONLY.

(*Answer two questions, including question 3 if you can.*)

1. If a side of a triangle be produced the exterior angle is equal to the two interior and opposite angles. (20)

2. The opposite sides and angles of a parallelogram are equal, and the diagonal bisects it, that is, divides it into two equal parts. (20)

3. Find the value of an angle of a regular hexagon, and the angle of a regular octagon, and prove the truth of your answer. (30)

Algebra.

MALES ONLY.

(*Answer two questions, including question 3 if you can.*)

1. If $a = 8$, $b = 6$, $c = 5$, $d = 4$, $e = 3$, $f = 2$, find the value of

$$\frac{4adf - 4cde + 2d}{3bce - 5ab - 3ef} - \frac{3ad - bd}{2bc + 3d} - \frac{7df - 11c}{7e - 2cf}. \quad (20)$$

2. Find the sum of

$3x^3y - 4x^2y^2 + 5xy^3 - 4x^2z$, $5x^2z - 5x^3y + 7x^2y^2 - 9xy^3 + 4x^2z$, $-3xy^3 - 5x^2y^2 - 2x^3y$, $3x^3y - 6x^2z + 6xy^3 + x^2y^2$, and from $(m-n)x^2 - (n+p)x$ take $(m-n)x^2 - (n+p)x$. (20)

3. What is Algebra? What are positive and negative quantities? When are algebraic quantities said to be *like* and when unlike? What is the rule of signs in multiplication? In division? (30)

Mensuration.

MALES ONLY.

(*Answer one question only.*)

1. Find the area of a footpath 11½ feet carried on all sides of a square, the area of which is 186,624 square feet. (20)

2. What is the area of a triangle whose sides are 11, 12 and 14 yards respectively? Give the answer in yards, feet, and inches. (20)

Arithmetic.

FEMALES ONLY.

(*Answer three questions only.*)

1. What is a decimal fraction? Convert $\frac{7}{125}$ and $\frac{2}{3}$ into decimals.

2. State the rule for pointing in addition, subtraction, and multiplication of decimals.

Multiply 3·087 by ·0875 and their product by 8·35.

3. What is the value of

$$\frac{10{\cdot}235 \times {\cdot}087}{7{\cdot}42 + 1{\cdot}36 + 2{\cdot}72}$$

4. If 577 books cost £72 2s. 6d. how many can I buy for £128 2s. 6d.?

Grammar.

(*Answer questions 1 and 2, and one other question.*)

MALES AND FEMALES.

1. *Blithe were it* then to *wander* here!
But now—*beshrew* you nimble *deer*—
Like that same hermit's, *thin* and spare,
The copse must give my *evening fare.*
Some mossy bank my couch must be,
Some rustling oak my *canopy.*

Paraphrase the above passage. (20)

2. Analyse it and parse the words in italics. (40)

3. Give the meaning of these prefixes, and three words in which each is used, with the meaning of the word:—ob-, ex-, in-, bene-, sub-. (20)

4. How would you explain *voice* to the Fifth Standard?

Geography.

MALES AND FEMALES.

(*Answer question 1 and two other questions only.*)

1. Draw a map of Arabia, or Further India. (30)

2. Write a description of Siberia, Persia, or Afghanistan. (25)

3. What are the chief physical features of Asia? (25)

4. Describe the couose of the Ganges, Indus, or Euphrates and Tigris. (25)

5. What vegetable and other products do we procure largely from Asia? (25)

SECOND PAPER.

(*Two hours and a half allowed.*)

(Needlework for Females. *One hour.*)

Arithmetic.

MALES ONLY.

(*Answer three questions only.*)

1. A garrison of 1,200 men have provisions sufficient to last them 6 weeks, allowing each man 15 ounces a day. If reinforced by 600 men, and are then only allowed three-quarters of a pound each per day, how long would the provisions then last? (30)

2. A fruiterer bought oranges at the rate of 4s. 6d. for 120. What number must he sell for 1s. so as to gain 33⅓ per cent.? (30)

3. What is the discount on a bill for £450 due October 8th and discounted September 11th at 3¾ per cent. per annum? (30)

4. What is *discount? Present worth?*

If I sell out £5,680 stock from the 3 per cents. at 92, what money do I receive, and what will be the change in my income if I invest the proceeds in the 4 per cents. at 106? (40)

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. Write a list of the chief events of the reign of Charles II., with dates, and give a full account of one of them. (25)

2. What is a Convention Parliament? How does it differ from an ordinary Parliament? Give the date of one in the portion of history for your year? (30)

3. Who was William of Orange? What events led to his becoming King of England? (25)

4. What arrangements were made for the succession of the Crown in William and Anne's reigns? (25)

5. Give an account of the military exploits of the Duke of Marlborough? (25)

Teaching.

MALES AND FEMALES.

(*Answer two questions only.*)

1. Write notes of a lesson on *Pronouns*, *A Town*, or *A country walk*, the two latter being taken for Second Standard Geography lessons.

2. Describe the use of sand or clay for models in teaching Geography to Second Standard.

3. What apparatus do you use when you are giving a lesson on colours to infants? State how you use it.

4. Write some specimen questions for Third Standard Mental Arithmetic or the First Class in your Infants' School.

END OF FOURTH YEAR.

FIRST PAPER.

(*Three and a half hours allowed.*)

Euclid.

MALES ONLY.

(*Answer two Questions, including Question 3 if you can.*)

1. If a straight line be divided into two equal, and also into two unequal parts, the rectangle contained by the two unequal parts together with the square on the line between the points of section is equal to the square on half the line. (20)

2. If a straight line be divided into any two parts, the square on the whole line is equal to the squares on the two parts together with twice the rectangle contained by the parts. (20)

3. Enunciate the proposition which proves that the area of a triangle is represented by half the rectangle, which has the same base and altitude, and write out the definitions of the Second Book of Euclid. (30)

Algebra.

(*Answer two Questions, including Question 3 if you can.*)

1. Express in its simplest form—

$$\frac{\dfrac{1}{x^4 + x^2y^3 + y^4}}{\dfrac{1}{x^3 + y^3}(x+y)} \times \frac{x^3 - y^3}{x - y} \quad (20)$$

2. Find two consecutive numbers, the difference of whose squares is three times the square of their difference. (20)

3. Solve the equations:—

$$(a) \begin{cases} \dfrac{a+b}{x} + \dfrac{a-b}{y} = a^2 \\ (a+b)\,x - (a-b)\,y = 0 \end{cases}$$

$$(b) \quad \frac{x+2b}{a} = \frac{a+b}{x+3b} \quad (30)$$

Mensuration.

1. What is the area of a circle whose diameter is 11·575 inches? (20)

2. Find the area of a regular octagon whose side is 11·4 inches. (20)

Arithmetic.

FEMALES ONLY.

(*Answer three questions only.*)

1. Find the simple interest of £650 for 3 years 73 days at 2¾ per cent. per annum. (30)

2. What is the discount on a bill for £923 due eight months hence at 4 per cent. per annum? (30)

3. At what rate per cent. will £45 amount to £48 7s. 6d. in six years? (30)

4. Define interest, proportion, discount, and commission. What is the compound interest on £150, payable half-yearly, at 5 per cent. for two years? (40)

Grammar.

MALES AND FEMALES.

(*Answer questions 1 and 2, and two other questions.*)

1. *Sweet* was her *breath as* the *breath* of kine *that feed* in the meadows,
When in the *harvest-time* she *bore* to the reapers at noontide
Flagons of home brewed ale.

Analyse the above passage. (20)

2. Parse the words in italics. (20)

3. Give examples of the use of words as two or three parts of speech. (20)

4. State of what principal languages the English language is composed. Give the proportions of each. (20)

5. Write out any six Latin words you know, and give examples of three words derived from each.

Geography.

(*Answer three questions only.*)

1. Draw a full map of Africa, South America, or India. (30)

2. Write a short description of the physical features of North America. (25)

3. What are the chief vegetable and mineral products of South America? (25)

4. Compare the Atlantic and Pacific Oceans. (25)

SECOND PAPER.

(*Two and a half hours allowed.*)

(Needlework for Females. *One hour.*)

Arithmetic.

MALES ONLY.

(*Answer three questions only.*)

1. Extract the square root of $\frac{3}{7}$ to six places of decimals, and the cube root of 18,609,625. (30)

2. If wine cost 15s. per gallon, how must it be sold per pint to lose 21¼ per cent.? and how so as to gain the same? (30)

3. Divide 240 into two parts so that ¼ of one added to $\frac{1}{10}$ of the other shall equal 36. (30)

4. If the three per cents. are at 98½, and I sell out £1,575 stock, paying brokerage, and invest in the 4 per cents. at 107½, what change will there be in my income? (40)

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. Give a short account of the doings of the Convention Parliament. (25)

2. What was the Mutiny Bill? What are some of the indirect results of the Mutiny Bill? (25)

3. Write an account of one of the attempts to deprive the Hanoverian king of the English throne. (25)

4. What led to the union of the English and Scottish parliaments? Name the chief articles of the Union Bill. (30)

Teaching.

(*Answer two questions only.*)

1. Write notes of a lesson on (*a*) the common pump; (*b*) the election of a member of parliament; (*c*) the climate of England.

2. Describe a good reading lesson.

3. Write six lines of poetry from your year's recitation, and show how you would explain it to a class.

For Teachers in Infant Schools.

1. Write notes of a lesson on (*a*) a daisy, (*b*) the goat, (*c*) a tea cup.

2. Give a number of specimens of questions in mental arithmetic suitable for the oldest children in an infant school.

3. Set a copy in large hand for the First Standand. Show the faults you have noticed in making the letters r, s, t, d, f, and g.

A Lesson to an Advanced Class on Sidereal, Solar, and Mean Solar Days.

BY JOSEPH H. COWHAM, E.G.S.,

Lecturer on School Method: Westminster Training College.

INFORMATION ARRANGED IN LOGICAL ORDER.

A. Simple Notions for recapitulation and Introduction.

1. The rotation of the earth upon its axis causes day and night.

2. The varying length of day and of night is caused by the earth revolving :—

   (*a*) Once a year round the sun.

   (*b*) With its axis inclined 23½° from the perpendicular to the plane of its orbit.

   (*c*) With its axis maintaining a constant direction.

NOTE :—Contrast the day above with the day as made up of the entire 24 hours and thus prepare for (B).

B. The Sidereal Day.

1. Suppose the earth to remain in the position of either Fig. 1 or 2, then a day, from noon to noon, would be the time required **for one complete rotation of the earth on its axis.**

2. Now if we examine a rotating globe E, so long as it remains in this position both S (sun) and B (a distant star) would be on a given meridian[*] always at the same time.

A **Sidereal** (or star) **day** would in this case coincide with a **Solar day**.

ILLUSTRATIONS AND TEACHING HINTS.

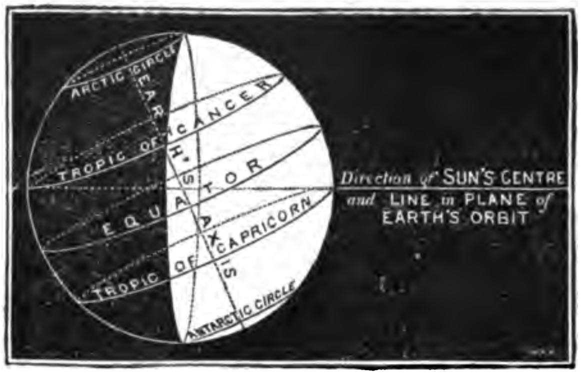


Fig. 1, showing one half of the earth in the dark, and remaining half in the light. Also the increasing length of day as we approach the south pole.

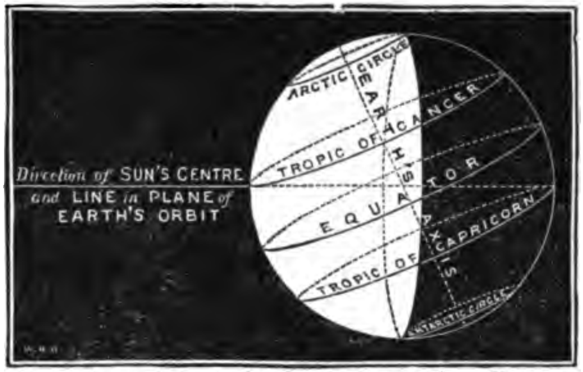


Fig. 2, the earth six months after the first position. Hence, on the opposite side of the sun ; the axis, however, is seen to point in the same direction as in Fig. 1. The days now increase in length as we approach the north pole.

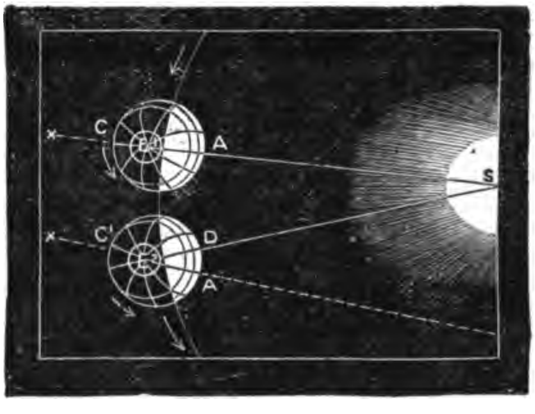


Fig. 3, to explain the difference between sidereal and solar days.

1. By the aid of a globe this statement is made evident.

2. With a globe simply rotating and not allowed to revolve this statement also is evident.

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[*] For simplicity the meridian is here supposed to extend entirely round the globe.

3. During one rotation, however, the earth travels forward in its orbit to a position E_2 but the star being so far away appears on the meridian again when the place C has been carried round once by a complete rotation of the earth, and takes up the position marked C′ in E_2. **The interval required for this rotation to be completed is a Sidereal day.**

Definition.—A Sidereal day is the interval between two successive appearances of a given star over the same meridian.

It is always the same in length.

C. Solar Day.

When a place A on E_1 has been brought to A′ on E_2 the earth has made a completed rotation.

The time interval of a sidereal day has elapsed, but A′ must be carried by the earth's rotation to D before the sun is again on the meridian of the place. Hence:—

1. The Solar day is always longer than the sidereal day.
2. It is longer by the time occupied by the earth in rotating through the angle A′ED, or the angle equal to it, viz. DSA.
3. Thus we see that the lengthened Solar day in comparison with the Sidereal day is due, in the first place, to the amount of movement of the earth in its revolution round the sun.

Definition.—The Solar day is the interval between two successive appearances of the sun on the meridian of a given place.

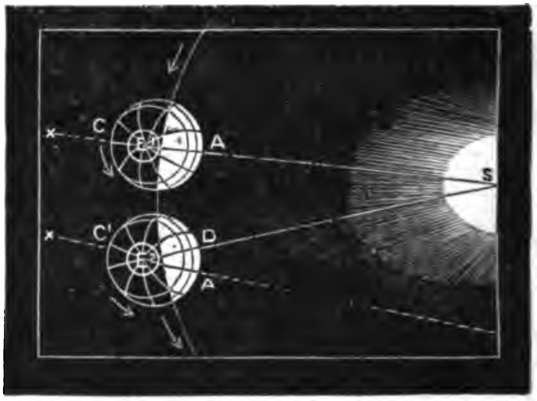
D. Mean Solar Day.

1. It has been shown above, that the lengthening of the solar day over and above that of the Sidereal day is due **to the movement of the earth in its orbit round the sun.**

3. The class must be told that the lines drawn from E_1 and E_2 to the distant star are parallel.

In illustration show that the two sides of a triangle become more nearly parallel the further the apex is removed from the base.

With the two lines E_1 and E_2 parallel, it will be seen that a sidereal day must be as stated in the definition.



By use of a rotating and revolving globe lead the class to see that the interval of rotation from the position A to A′ is equal to that from C to C′. Then ask the class to state the amount of rotation required for the sun to be again on the meridian of A.

1. In this way the difference between a Sidereal day and a Solar day may be shown.

2. The amount of difference should be stated from a careful examination of the diagram.

3. The equality between the angles A′ED and DSA must be shown by reference to geometry.

Do not form the definition until the above notions are grasped by the class.

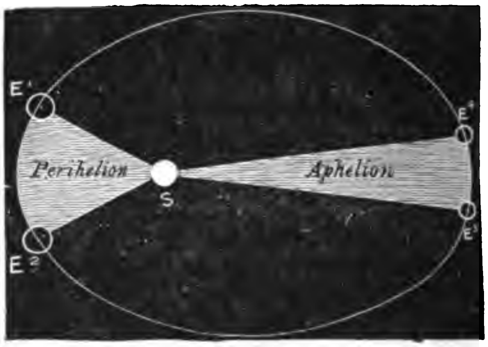


Fig. 5, showing the different rates of movement of the earth in Perihelion and in Aphelion.

1. Has already been explained and hence may be stated without further explanation.

2. The amount of this movement **varies from day to day.**	2. This statement is made first by the teacher and afterwards explained by the aid of the above diagram and a reference to the laws of gravitation.
3. One reason is as follows: In our winter the earth is nearer the sun than in summer, and when nearer, *i.e.*, in Perihelion **it moves more quickly in its orbit than when it is farthest away, *i.e.*, in Aphelion.**	3. The necessity may be impressed by reference to watches and clocks which are made to keep regularly the same interval of time and therefore could not be made to keep Solar time. Now ask what time they keep?
Hence the Solar day varies in length and the necessity arises for a **Mean Solar day.** **The Mean Solar day is the average of all the Solar days throughout the year.**	The mean Solar day is the day indicated by our watches and clocks.

BLACKBOARD NOTES.

1. Day and night are caused by the **Rotation of the Earth on its axis.**
2. The variations in the length of day and of night are due to the earth revolving round the sun with an axis inclined constantly in the same direction, and at an angle of 23½ degrees.
3. **The Sidereal Day** is the interval between two successive appearances of a given star over the same meridian.
   It is always the same in length.
4. **The Solar Day** is the interval between two successive appearances of the sun on the meridian of a given place.
   It is always longer than the Sidereal Day.
   It is not always the same interval of time.
5. **The Mean Solar Day** is the average of all the Solar Days in a year.

Science Notes.

Sir James Paget's address on Study has attracted a good deal of attention, though not more than it deserved. He reminded his hearers what might be acquired by a scientific training—power of observing with accuracy, perception of the difficulty of attaining a real knowledge of the truth. The first thing to learn, he said, was the power of observing, the power of seeing things in their relation to other things and the modifications they might undergo. This was a difficult thing as was proved by the discoveries that had been made. Variations were occurring every week, but only the discoverer detected them. Another pregnant sentence should not be passed over lightly. 'In all scientific study a student should not only read the best manuals on the subject but at least one of the works of the best masters on the subject.'

⁂

The Science and Art Department will introduce some changes into next edition of the Directory.

The Practical Geometry of the 2nd grade (Art) will be amalgamated with the Science subject known as Practical Plane and Solid Geometry. It is also gratifying to learn that a new alternative subject of Elementary Physics will be formed for those students who do not propose to continue their studies further in this branch of Science, but to whom an elementary knowledge of Physics is necessary to enable them to pursue their studies in other subjects with advantage. The Syllabus will include some portions of the subjects treated in the elementary or first stage of 'Sound, Light and Heat,' and of Electricity and Magnetism. We are sure this is a step in the right direction. The success of the alternative subject in Chemistry has doubtless encouraged the department to add one on Physics. When both these alternative subjects are fairly launched, it will be easy to make a regulation that no pupil should be examined in Physiology, Physiography or Botany who has not already passed the examination of the Department in these two very important subjects. We feel sure if this were done many of the examiners' complaints would be heard no more of.

⁂

In his annual address to the Royal Microscopical Society, the President, Dr. Dallinger, called attention to the monads usually known as putrefactive organisms. There could be no doubt, he said, that the destructive process of putrefaction was essentially a process of fermentation. Alcoholic fermentation is rendered impossible if the presence of torulæ be excluded and in a similar way a putrescible liquid will remain absolutely without trace of decay no matter what length of time may be suffered to elapse if only it has been absolutely sterilized and placed in absolutely pure air.

As in the alcoholic, lactic or butyric ferments the process set up is shown to be dependent upon and concurrent with the vegetative processes of organisms characterising these ferments, so it can be shown with equal clearness and certainty that the entire process of what is known as putrescence is as equally and absolutely dependent on the vital processes of a given or discoverable series of organisms. Each of this series does a part in the work of fermentive destruction, each aids in splitting up into lower and lower compounds the elements of which the masses of degrading tissues are composed, while each in turn takes up what is necessary for its growth and multiplication and so renders the pabulum fit for its immediate successor. There can be no doubt whatever that the pioneer in putrefaction is *bacterium termo*. Exclude it and you can obtain no putrefaction. Fermentation being set up, noxious gases are evolved, and in a week or so other forms such as those of *sporillum* begin to appear. The way then by which Nature acts upon the vast masses of dead organic matter is not by *bacteria* alone, but by a series of fermentive organisms which arise and succeed each other, the earlier ones preparing the pabulum or altering the surrounding medium so as to render it highly favourable to a succeeding form. In all these however, bacteria are the first and in many ways the most important series of destructive forms.

⁂

The effect of oil upon the surface of troubled water has long been known and has indeed passed into a sort of proverb. It seems that a small quantity spreads with great rapidity and acts practically as a breakwater to a ship in a storm. The amount of oil required is apparently very small. It is said that less than half-a-gallon per hour is enough to prevent the waves breaking over the largest ship. The practical application of this knowledge is yet only in its infancy. Considering the interests involved both to life and property one cannot too strongly hope that the matter will receive all the attention it demands and be the means of saving many of the terrible catastrophes that are now too common.

⁂

A new method of determining the molecular weights of non-volatile as well as volatile bodies has just been published in the *Berichte*. It was discovered by Raoull. The method depends upon the lowering of the solidifying point of a solvent, such as water or benzene, or glacial acetic acid, by the introduction of a given weight of the substance whose molecular weight has to be determined. The amount by which the solidifying point is lowered is connected with the molecular weight M by the following simple formula: $M = T \times \frac{P}{C}$, where C is the amount by which the freezing point is lowered, P the amount of anhydrous substance dissolved in 100 grammes of the solvent, and T a constant easily determined for the same solvent by the use of a substance whose molecular weight is already known. It is expected that the method will prove very useful in checking molecular weights in the same way as the well-known generalization of Dulong and Petit.

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music.

CODE REQUIREMENT.

Division II.—Standards I. and II.

NOTE TESTS.

To sol-fa slowly, from the Examiner's pointing to the Modulator, in any keys, the key tone and chord being given, the tones of the doh chord in any order and the other tones of the scale in stepwise succession.

13. In section 2 it was observed that the code requirements only roughly indicate a method of teaching. It is important at this stage to examine more in detail some considerations arising from this fact. The goal of all the efforts in Divisions I., II., and III., should be to teach in a most thorough manner the set of related sounds called the common major scale; the relations expressed by the names doh, ray, me, fah, soh, lah, te, doh'. A grasp of these relations is very far from being implied by any amount of facility in singing up and down the scale. Stepwise (that is, moving from one note of the scale to the next above or below) exercises have their uses in voice training, but to the would-be sight singer they are a delusion and a snare. Actual music is as full of leaps as it is of stepwise movement and you cannot teach these leaps by practising creeping.

14. To know the scale then we must be able to sing all possible leaps as well as all possible steps. How to go about this systematically is a question of method.

15. All the distances of tones from one another may be described in terms of interval. That is, these or those tones are said to be a major third, a minor sixth, etc., from one another. One method of teaching scale relations is to incessantly practise the various intervals until the peculiarity of each is impressed upon the mind's ear. When all possible skips are thus labelled and differentiated by the ear, the pupil is considered to be fully equipped for his task. This is a very difficult method and is certainly not the Tonic Sol-fa method. A select few, gifted with much more than ordinary capacity, with ample opportunities for practice, and with skilled attention, can on this method learn to sing; but for the great masses of children in our schools, taught as they must be by teachers who cannot claim to be specialists, such a method is certain to result in discouragement and failure. It is not asserted that the study of intervals is useless: on the contrary, such a study is indispensable to the musical student; but it has no practical bearing upon an elementary course of singing.

16. The Tonic Sol-fa method of teaching the scale is distinguished by two principal features. First, the grouping of sets of tones into Chords is the foundation of the *order* in which tones are introduced; and second, the remarkable fact that each tone of the scale has a peculiar effect, is utilised from almost the first lesson. It is to be feared that many school teachers who have only partially studied the Tonic Sol-fa system, attempt to teach it without having grasped the leading principles of its exposition of musical facts. They teach the notation but not the method.

17. The tones *doh* and *me* chord well together, so do *me* and *soh*, so do *doh*, *me* and *soh*. This combination is called the chord of DOH. Similarly chords can be built on any scale note by adding notes a third apart: *e.g.*

s	l	t	**d'**	**r'**	m'	f'
m	f	s	**l**	**t**	d'	r'
d	r	m	**f**	**s**	l	t

The chords set in thick type are the most important. They will be seen between them to include all the tones of the scale.

		r'
d'	**d'**	
		t
l		
	s	**s**
f		
	m	
	d	

These three chords form the three first steps of the Tonic Sol-fa method.

Doh or Tonic Chord	1st step.
Soh or Dominant Chord	2nd step.
Fah or Sub-dominant Chord	3rd step.

Doh and soh each belong to two chords. When the tones of a chord are sung in succession instead of in combination they are still called chords, and in whatever order they occur, they exemplify the chord: *e.g.* —**d m s**—**m s d'**—**s d m d'** or **s r' t**—**s r t**—**t r' s**—**d f l**—**l f d'**—**d' f l**. Some orders of arrangement are easy to sing, some difficult. The difficult successions in the doh chord were noticed in sec. 7. Difficult leaps in the other chords will be noticed as occasion requires.

18. The mental effects of the various tones of the scale are described in almost every Tonic Sol-fa instruction book. They need not be recapitulated here. The method of utilising them alone calls for remark. Children should not be expected to be able to describe correctly the mental effects of tones sung to them. These effects should be the subject of *repeated* and *varied* demonstration. The ingenuity and resource of a teacher must be continually drawn upon to provide vivid and picturesque illustrations. Hints on this point will be given as the tones of the scale are dealt with in turn.

19. One other important principle of teaching adopted in the Tonic Sol-fa method must be mentioned before going into details. This is the principle that a teacher should *pattern* to his pupils—he should sing *to* them and not *with* them. Apart from the fatigue thus avoided the advantages of this plan are numerous and important; the teacher can be heard better by the pupils and he in turn can clearly hear them, and the pupils learn to be independent. Some teachers almost unconsciously 'help' their pupils over all difficulties by singing with them even when pointing a modulator exercise.

20. It is not meant by the foregoing to recommend the teacher not to use stepwise exercises. What he has to do is to combine chordal and stepwise exercises and to illuminate his practice by repeated references to mental effects. Filled with these ideas we can discuss the scale tones now to be taught.

21. *Te* and *Ray* (making, with *soh*, the SOH chord) are the tones to be taught in the second step. According to the intelligence of the class the discerning teacher will adopt this or that method of presentation.

22. *Te* may be introduced on what we will call the (*a*) method. The class is asked to discover when a sound not **d m s** or **d'** is introduced. The teacher promises to sing to *laa* several tones of the DOH chord and *perhaps* a new note. He then sings say **d m s m d**, and **d m s d'**, and **d m s s t d'**, each time questioning the pupils. When it is fairly agreed that the new note has arrived, its peculiarity may be studied. The teacher may sing (still to *laa*) **d m s s** $\overset{\frown}{\mathbf{t}}$ and ask the children to decide whether the last tone calls for more or whether it sounds finished. Then the name may be given and the following phrases sung from the blackboard 'modulator' which so far should show just the tones known or being studied and no others. Each phrase should be first patterned—(1) **d m s m** (2) **s t d'** (3) **s s m m s t d'** (4) **s t t d'** (5) **d m s s** $\overset{\frown}{\mathbf{t}}$ **d'** (6) **d' t d'** (7) **d' s t d'**. Many other similar exercises will be found in Curwen's books. The hand sign may now be introduced to deepen the impression made. The sign for *te* is one of the best of the series. It is so singularly appropriate and suggestive.

23. A more dogmatic form of introduction may be necessary for some classes. We will call the following the (*b*) method. The teacher promises a new name and a new tone at once and asks pupils to hold up hands when they hear the new comer. He then sings the foregoing exercises to the Sol-fa names.

24. Ray having been introduced on the (*a*) or (*b*) methods, using say such phrases as (1) **d m s m r d** (2) **d m r d** (3) **d s r d** and, of course, the name added to the blackboard modulator, the best method of exercising the class in all the tones learned must now be considered. The teacher must learn to make good voluntaries.

25. A voluntary is an exercise made up by the teacher and pointed on the modulator. Very much depends upon the teacher's skill in making fresh but not too difficult voluntaries. The greatest danger is that of falling into a stereotyped style, a practice of pointing the same succession over and over again, *doh* always being followed by *me* and that by *soh*, *ray* always leading to *doh*, etc., etc. As in the effort to avoid monotony he may stumble on great difficulties it is best for the inexperienced teacher to prepare his voluntaries beforehand. A voluntary should always have an intention and should not degenerate into a dry, uninteresting and perfunctory exercise.

(To be continued.)

Publications Reviewed.

The Royal Upper Class Readers: Collier's Great Events of History. London: T. Nelson and Sons.

In this volume the publishers have re-issued, in a revised, enlarged, and greatly improved form, a work written several years ago by Dr. Collier. The object aimed at is to fill up the many gaps which often remain in the historical knowledge of students on leaving school for business and professional pursuits. The plan of the author is to select central points of interest, and describe the various events which cluster round them, so as to give a chain of the most important incidents in the world's history, from the Christian era down to very recent years. Thus, the centre of interest is at one time in Italy, at another in France, at another in Germany,—at Constantinople, in the Netherlands, in Palestine, in Spain. At the same time, by connecting tables and summaries, the element of continuity is not lost sight of. The style of the chapters is picturesque and attractive, and indeed in many passages it may be properly pronounced brilliant. All the modern collateral aids supplied in the best reading books are present here—chronological and other tables, biographical and geographical notes, maps and illustrations; and all are good of their kind. Such a work, dealing as it does with great men like Charlemagne, Charles the Fifth, Louis XIV., Peter the Great, Frederick the Great, and Napoleon; and with such great movements as the Foundation of the Roman Empire, the Crusades, the Reformation, and the French Revolution, cannot fail to be appreciated by those who have a taste for historical reading, and is eminently suitable for the upper classes of middle class and other schools, and also for pupil teachers and advanced scholars in elementary schools

The Royal Upper Class Readers: Great Authors, from Macaulay to Browning. London: T. Nelson and Sons.

We have here another school reading book worthy of the highest praise. It forms one of a series for the purposes of which modern English literature is divided into three periods. The second period, extending from Goldsmith to Wordsworth, was dealt with in the first volume, which we recently noticed. The third period supplies the material for the second volume, which is now before us. And the first period, including Spenser, Shakespeare and Milton,—and therefore requiring more advanced knowledge for its due appreciation—is very properly reserved for the third volume. The present book contains pleasantly written biographies of Macaulay, Carlyle, De Quincey, Ruskin, Dickens, Thackeray, Tennyson, and Browning among English writers, and the two great representative American authors, Irving and Longfellow. The literary work of these eminent men is admirably illustrated by well-chosen selections of sufficient scope and variety to give a good idea of their style. A further result of judiciously using this book will be to implant and foster a desire to become better acquainted with the works from which the selections are made. The paper, type, and general appearance of the volume are all alike attractive.

Exercises in English Word-Formation and Derivation. By Frank Ritchie, M.A. London; Swan, Sonnenschein, Lowrey and Co.

This is a little book of exercises only; but it contains such a variety of exercises on the formation and derivation of English words, that it would be difficult to find new and useful forms of test to supplement the work of Mr. Ritchie. On every page appear copious lists of words to be dealt with according to the requirements printed at the head—as nouns to be given corresponding to verbs, allied verbs and adjectives, frequentatives, diminutives, force of prefixes and affixes, contrary meanings, roots of words, derivatives from roots, cognate words, divergent meanings, synonyms, phrases, abbreviations, alternative spellings, and many others. The book, which is marked by an entire absence of any words of introduction as to the mode of using it, is nevertheless likely to be very serviceable in saving teachers' time and trouble in framing suitable exercises on an important part of the study of language.

Health Maps. By Anna L. Arnim. London: Swan, Sonnenschein and Co.

These health maps, as they are called, are diagrams of gymnastic exercises intended to strengthen the various parts of the human body and preserve it in a state of health. There can be no question of course as to the importance of physical exercise any more than there can be of fresh air and good food. It is however painfully manifest that in crowded towns the young people find less and less opportunity for outdoor exercises, or indeed for any suitable exercises at all. For such any systematic drill would be a real boon. But it must be admitted that what is most wanted is the ability to teach a rational system of drill to the young persons, who would gladly enough benefit by it. The idea of gymnastic training is to some extent novel, and has not yet spread very widely among the people of this country. We therefore welcome this new and rather elaborate attempt to popularise the subject on a wider, though apparently, a private scale. These maps can be bought, and persons can by a little attention see the sort of exercises that will be most likely beneficial to them, and then practise them for a few minutes each day for themselves. We have some doubt as to this practice becoming very general. The English people are very conservative, and change their habits slowly. None the less we wish success to these maps. They will be useful, and when they are better known they will be more appreciated and more widely circulated.

A Critique of Kant. By Kuno Fischer. London: Swan, Sonnenschein and Co.

Students of Kant, and there are not too many of them, though an increasing number truly, have all heard of Kuno Fischer. His great work on the History of Modern Philosophy was for a long time mostly inaccessible to English students. The 'Critique of Kant,' which gives the main results of the two volumes on Kant in the history, together with the author's criticism on the Kantian doctrines, are now presented to the English public in a handy volume of less than 200 pages. Those who are interested in this great thinker's work, so important in itself, and especially so for us at this time, cannot do better than read Professor Fischer's criticism in its English dress. The difficulty of the subject itself is sufficient for most of us, without the additional incumbrance of a foreign language. We have no doubt this volume will be graciously received by those who have made a study of any of Kant's great works.

Ants, Bees, Dragon-flies, Earwigs, Crickets, and Flies. By W. Harcourt Bath. London: Swan Sonnenschein, Lowrey, and Co.

In this little volume, one of the 'Young Collector' series, Mr. Harcourt Bath has attempted the impossible; to give an account of five of the principal orders of insects, with numerous illustrations, in the compass of 108 octavo pages, were as feasible an undertaking as the endeavour to compress Lake Windermere into a teacup. All that the author has succeeded in doing is to enumerate the various tribes and families of the different orders, and to give a passing mention of some of the more typical species. In what manner the book may prove of value to the 'Young Collector' we cannot pretend to understand.

This is the more to be regretted, inasmuch as a popular work on the less familiar orders of insects is very greatly needed. A young entomologist, in taking up flies, ants, bees, or dragon-flies, finds absolutely no book to guide him during the earlier portion of his task, in which, of course, his need of help is the greatest. And even when he has made some progress, information upon his special branch of entomology can only be obtained by the purchase of expensive monographs, the great majority of which are written in what we may describe as the scientific vernacular of various continental languages. To supply such a book as is required the author of the little volume before us has no doubt done his best; and we can detect but two or three very trifling errors in that which he has written. But he has been hopelessly handicapped in his undertaking, firstly, by the vast extent of his subject, whose students are numbered as yet by units only; secondly, by the exceedingly narrow limits of space assigned; and, thirdly, by the necessity which has obviously been forced upon him of employing a large number of woodcuts without any reference to the letterpress. The book is profusely illustrated—there are 156 figures in all—but not one-third of the insects depicted belong to British species, while even of those which are given a large proportion are familiar to the veriest tyro in entomology. Reluctant as we are to say aught but in praise of a book which aims to supply a long-felt want, we fail entirely to understand how the little volume before us can prove of the slightest real utility to anybody at all. It is too scientific and general for the beginner, too superficial for the more advanced student; and therefore the number of readers who can obtain any benefit from its pages must necessarily be very small indeed.

Jones's Standard Arithmetic. London and Manchester: John Heywood.

This was among the first of the books for the standards, consisting of examples only in arithmetic. It supplies a very large number of exercises, suitable for mechanical work in the various standards.

A System of Practical Arithmetic. By Samuel Young. John Heywood.

This is just and only what the title pretends it to be, viz., a Practical Arithmetic; full of rules, tables, and examples.

It is intended wherewith to prepare lads for the actual arithmetical operations they may have to perform after they leave school—*e.g.*, on page 181 we find this question: What weight will be required to break a beam of English oak, the breadth being 3 inches, the depth 6 inches, and the length 20 feet? Looking at the rule we find 'The product of the tabular number in Col. S (which we will explain directly), the breadth and the square of the depth in inches, divided by the length in inches, will give the weight in lbs.' Col. S is the tabular statement of multiplicands for the transverse strains of timber, which of course, varying for different woods, can only be found by actual experiment—that for E. oak being 1672.

We do not suppose for one moment that any lad in a surveyor's office would mind performing the above operation, in which accuracy of course is most important, when he knew that it was really required for practical purposes; but to work such examples at school, without having the slightest idea of a reason for any part of the working or in what way the mystic 1672 was found, is, we believe, not only a wasted opportunity of strengthening the reasoning faculties, but a performance so distasteful to the intellect as to positively do it harm.

We do not think it would increase the work to any very great extent, if some hints were given as to the reason for each rule.

We should not have made these somewhat strong remarks had we not read on the title-page that the work is prepared for schoolboys. Arithmetic is one of our best educational subjects if properly taught by intelligible teachers, but not one master in a hundred could explain such a rule as we have quoted so as to make it educational at all.

Ashman's Spelling Book. London and Manchester: John Heywood.

In this little book words are arranged according to their length. After easy words of one and two syllables and an exercise on the diphthongs, the chief plan of the book is introduced. This consists of alphabetical lists of words of one, two, three, and more syllables with their meanings in simpler words, where possible arranged in parallel columns. A successful attempt has been made to secure correct pronunciation by re-writing phonetically most of the difficult words. A list of the most common prefixes, suffixes, and roots is added. We think the design of the author, which is to make children better acquainted with the meaning of the words they meet with, will be answered by the use of the book; and in any case it will afford good practice in spelling, pronunciation, and the use of synonyms.

Dynamics and Hydrostatics. By R. H. Parkerton, B.A. London: Blackie and Son.

This is one of Messrs. Blackie's Science Text Books. It is excellent both in plan and execution. The aim of the author is to explain what is usually included in a first course of Dynamics, including Hydrostatics. The book is characterised by great clearness and accuracy. It is especially noticeable in important matters like definitions and units. The subject is also treated according to modern methods. All the important propositions are followed by examples fully worked out, and also by others which are left as practice for the student. The book is intended to be used by those who are beginning the study of the subject and are only able to follow simple mathematical methods. It will be found amply sufficient for such examinations as those of South Kensington, the Civil Service, and also for the Junior and Matriculation Examinations of the Universities.

Electrical Instrument Making for Amateurs. By S. R. Bossone. London: Whittaker and Co.

This is a small volume of 180 pages, well printed and illustrated. It is essentially a book for amateurs. To them it will be welcome indeed. To those who only want to read, but not to construct, it will be prosy and dull. The true amateur, says the author, as a rule, has not a large assortment of tools. Little by little he gets together or constructs those which are necessary for his purpose, but he seldom aspires to the complete paraphernalia of a workshop. Then we have a list of tools that are considered essential. They are not many, nor dear. With these the author begins. Detailed instructions are given for soldering; and to many persons the book would be worth buying if only to learn how to perform that very useful operation with moderate success. We can cordially recommend this book to any of that increasingly large number of persons who think the time has come to add practice to knowledge, and to spend a little of their spare time and energy toward rendering themselves more useful, independent, and self-reliant. But we repeat it, this is not a book to be read and put by. Only those who want to learn how to do something with their hands should buy it; others would be disappointed.

The Citizen Reader. By H. O. Arnold-Forster. London: Cassell and Company.

We had the pleasure of commending Mr. Arnold-Forster's Citizen Reader on its first appearance, two or three years ago. We notice it again, because it is an excellent example of the type of reading book we have often mentioned in this journal as having higher educational tendencies than the miscellaneous selections which form the ordinary school readers, and also for the purpose of expressing our satisfaction at the fact that it appears to have been so widely appreciated. We need not repeat our praise of the simple, straightforward, and telling style in which the book is written; but we ought to state that, in the present revised edition, statistics have been brought down to date, and additional explanations and some very good and suitable illustrations have been introduced.

Addresses by Edward Thring. T. Fisher Unwin.

We can conceive of few greater gifts in the cause of education than for a rich man to purchase a sufficient number of copies of this wonderful collection of thoughtful essays on the above subject, and distribute them to every teacher in the land, from the highest to the lowest.

Our space prevents our entering in to the special features of the volume as we should like, and as it deserves. Truly indeed, with such a legacy to the teaching world, 'he, being dead, yet speaketh.'

An Elementary Text Book of Physiology. By J. McGregor Robertson. London: Blackie and Son.

This is one of the series of Science Text Books now being issued by Messrs. Blackie. Students will find it a helpful, reliable book. We can recommend it very strongly. It professes to meet the requirements of the Science and Art Department, and of the local examination boards of the universities. The author has saved much space by giving an account of the facts and principles of Physiology, not in disconnected paragraphs, but woven into a continuous story.

The student is recommended to read the book through to begin with, with the object of gaining a general knowledge of the subject, and then afterwards limit himself to those parts of the subject which he wishes to study. This is no doubt sensible advice. We believe those who read and understand this book will be well prepared for many of the examinations held on the subject of Physiology, and will pass them with credit. It has, however, always seemed to us that Physiology is a very difficult subject to master, and that to get it from books alone, however ably written, is to attempt the impossible. It leads to thinking we know, when we do not. Persons read about these physiological processes, about the wonderful apparatus by means of which we live and move and have our being. They are interested and even fascinated. But without some previous acquaintance with Chemistry and Physics, and without constant references to the organs and processes themselves, the study of Physiology as a scientific study of science is a delusion and a snare. By many people it is thought to be almost necessary to know something of Physiology. This is unfortunate. It is bad for Physiology, and worse for those who, by having passed an examination in it, are led to believe they know something about it, when in reality they only know the contents of a book.

The Characters in Hamlet and other important Shakesperian Plays delineated.

By William Weeks. London: Thomas Murby.

It is much better that the student of Shakespeare's plays should gather his ideas of the characters by carefully reading the plays and reflecting on them, than that he should simply take his opinions about the characters at second hand. Still, the preparation for an examination is so often the chief motive of the student, and the stress of such necessity often makes it so difficult to adopt the best plan of study, that every kind of help is welcomed. And, indeed, no help is more worthy of welcome than such as Mr. Weeks affords in this little book of notes and extracts on the characters in Julius Cæsar, Coriolanus, Richard II., Macbeth, King Lear, The Merchant of Venice, The Tempest, and Hamlet; provided it be used as an appendix to such careful personal study as may be practicable.

The notes have been accumulated in the course of reading for the purpose of preparing second year students in a training college for the requirements of the certificate examination, and include valuable quotations from Gervinus, Coleridge, Hazlitt, Ulrici, Mrs. Jameson, Schlegel, Dowden, Hudson, Moberley, and other Shakespearian scholars. In this lies the highest value of the work, for most students cannot get access to the works of these authors, and here they have the most pertinent portions of such works collated for them by one who has done his work in a sympathetic spirit, and has made the result available in a convenient form.

Thom's New Reading Books: First Primer, Second Primer, Infant Reader. Dublin: Alexander Thom and Co., Limited.

These little books are well adapted to the purpose of initiating infant pupils into the early stages of reading. The plan of teaching new words by similarity of spelling is adopted to a considerable extent; but we doubt the advisability of introducing such difficult combinations as *gnaw*, *gnat*, and *buy* in a first primer. The typography of the primers is remarkably bold and clear.. The Infant Reader contains several of the childish poems of Jane and Ann Taylor, and a number of quaintly fresh fables. All the books are suitably illustrated, many of the woodcuts having the clearness and delicacy of pen-and-ink drawings. Some of the illustrations of the fables are exceedingly droll.

Moffatt's Handbooks for Students: Shakespeare's Twelfth Night. London: Moffatt and Paige.

Among the many editions of Shakespeare's Plays for students preparing for examination we know of none in which the methodical arrangement of various kinds of help has been so thoroughly carried out for the student's convenience. The book begins with a page of discussion on the 'Date of the Play.' Next comes a page on the 'Sources of the Plot.' This is followed by a 'Sketch of the Plot,' a plainly written narrative, which states in due order all the incidents of the play. The text is printed with a rather wide margin on the right of each page, and in this are placed short explanations of certain words, which are distinguished by italics. These explanations are generally of the nature of synonyms; they seem to be quite sufficient for their purpose, and are likely to be useful in paraphrasing. After the play we find a large amount of information classified under separate headings. First, a series of 'Miscellaneous Notes' to explain curious or difficult expressions referred to by numbers in the text; then 'Notes on the Language of the Play,' given in alphabetical order, instances of grammatical peculiarities, with quotations, references, and explanations; next, several pages of 'Etymological Notes,' which supply the derivation of the note-worthy words. 'Proper Names' are given with explanations of the allusions to them; paraphrasing and analysis are illustrated by examples; and the book ends with carefully written sketches of all the important characters, and 'Literary Notes,' quoted from such Shakespearian critics as Hazlitt, Mrs. Jameson, Charles Lamb, and H. N. Hudson. This detailed statement of its contents shows how methodical and complete are the idea and arrangement of this handbook, and it only remains to add that the whole of the work appears to be thoroughly well done.

The Standard Algebra. Enlarged Edition. London and Edinburgh: W. and R. Chambers.

This is a thoroughly practical book of 104 pages, covering two stages of the specific subject, algebra of the code. The explanatory part is clear, full, and accurate. Many illustrative examples are worked out in full, while the exercises, some two thousand in number, are all original. The chapters on general results in multiplication and resolution into factors are now considerably enlarged, and forty test exercises have been added. From personal knowledge of the book, we know that results obtained by its use are thoroughly good. It has our hearty commendation.

Practical Geometry for Art Students. By John Carroll. London: Burns and Oates.

This book embraces the whole of the work required by the second grade art syllabus of the Science and Art Department, and will be found equally serviceable under the new regulations for the D. certificate. It is thoroughly practical and cheap. No private student needs a better book, and no teacher could place a more trustworthy text book in the hands of his pupils.

New Standard Drawing Copies. London: Cassell and Company.

This series of drawing books for the new drawing schedule is now completed by the issue of two books for each of Standards V. and VI., and four books for Standard VII. The freehand copies for Standard V. are very bold and clearly drawn, while the practical geometry book leaves nothing to be desired either in the figures or the letterpress. The same may also be said of the books for Standard VI., the series of examples in the solid geometry for this Standard being very carefully and suitably graduated. To compass the work of Standard VII. will need all the time which a teacher can find for the subject. The freehand is equal in difficulty to that required for second grade art, while the requirements in solid geometry go beyond those for the same grade. If, however, the work can be got through, it will be by the aid of these capital books. The twelve last of the series consists of exercises in shading. The cube, cylinder, sphere, various prisms, and the cone, are the subjects of the exercises, and the process of shading is carefully developed; but the principle on which the shadows are formed is left entirely to the teacher. They are good copies; and pupil teachers and others who have not had much practice in shading, would do well themselves to use the book as an introduction to more extended work.

Poynter's Drawing for the Standards, Books 13, 17, 18, 21. London: Blackie and Son.

Messrs. Blackie continue the production of this good series of drawing books. Book 13 forms part of the work Standard IV. The instructions for the formation of scales are very full, but the language is somewhat difficult for the ordinary fourth standard child. Some of the examples in the book are also rather advanced. Books 17 and 18 cover the geometry required by the schedule for the fifth Standard, and are suitable for the purpose. In practice, the figures should be much larger. Book 21 continues the instruction in model drawing already introduced in books 11 to 16. A scholar who has fairly mastered the contents of these books will be well prepared to attack models themselves, while the teacher has in them capital examples of blackboard copies for class teaching purposes.

Australasia. By W. Wilkins. London: Blackie and Son.

In a book of 252 pages, Mr. Wilkins has given a full descriptive account of our Australasian colonies and the adjacent lands. It is intended principally as a reading book for advanced classes, and it might also be used with very great advantage by the pupil teachers, whose course of geography includes the British Colonies. The book has upwards of forty illustrations and is prefaced by a map fully coloured, while maps in black and white are interspersed throughout the text. Although not intended as an ordinary text book, we know of no book intended for a similar purpose containing such a mass of information brought down to the latest date. It is written in a pleasant, agreeable style, and the various items of information being given in the same order for each of the colonies, it will serve as a ready book of reference for those whose leisure does not permit them to make themselves fully acquainted with the geography of that part of the world of which it treats. No intending emigrant to Australia or New Zealand need be ignorant of the natural history and capabilities of the land of his adoption who carefully reads Mr. Wilkins' book. It has evidently been written by one well acquainted with what is expected in such a volume, and who is fully convinced of the great future which lies before the continent of the Southern Ocean.

Albert, the Prince Consort. By G. Holden Pike. Messrs. Hodder and Stoughton.

We must congratulate Mr. Pike on the way in which he has compressed into 228 pages so much interesting matter about this good and great man.

The work is divided into ten chapters, which are almost essays in some cases, on the different phases of the Prince's character and life; *e.g.*, we have a chapter headed 'The Friend of the Poor,' and another 'His Christian Life.' True, there is one chapter of a somewhat different character, viz., that which is devoted to the Great Exhibition of 1851.

The author has had permission to draw from Sir Theodore Martin's standard work on the same man, but we are assured there is a great deal of original matter in this volume.

The book ought to be of use to many, young and old, rich and poor,—all in fact who wish to live the life, which it is in the power of all to live, viz., that one that is of advantage to all they come in contact with, whether their lot be high or low, and accompanied or unaccompanied with riches.

A New Testament Primer. By Edward Miller, M.A. Clarendon Press.

This is an admirable little book, thoroughly well adapted to its purpose, which is not to teach the Greek language, but to enable zealous students of the sacred books, who have not had the advantage of a classical education, to read these books in the tongue in which they were written. In 63 pages the essential parts of the accidence are clearly set out. There is then a very short syntax of 10 pages, in which the illustrations from the Greek are all selected from the New Testament. The rest of the book, about 60 pages, consists of a reading primer with vocabularies. The sentences are at first remarkably easy; they increase in difficulty, and finally the student finds himself translating consecutive passages from the easier chapters of the New Testament. We are pleased with the book. It is likely to be very useful to the rather large number of persons who would like to read the New Testament in the original, but have not had the advantage of a grammar school education, and who do not intend to read the Greek authors. The usual introductions to Greek, excellent as they are for those who are proceeding to the higher parts of the subject, are needlessly difficult and discouraging.

There is a shorter way for them, and we believe in this book it has been found. We hope it may be widely circulated and seriously studied.

Magnetism and Electricity, for the Matriculation of the University of London. John Bowick, B.A., LL.B. Stewart and Co.

This little book of 126 pages is an attempt to put in as concise a form as possible the matter required in magnetism and electricity by the University of London for matriculation under the new regulations. The book is clearly written and well illustrated. Questions are given at the end of the chapters. There is nothing strikingly original in the method of treatment. We presume it is intended to be used as a text book, the experiments being carefully done by a teacher. There are no directions for the pupil to do them for himself, and some of the illustrations might have been simpler if the pupil is to be student and teacher in one. The electroscope on page 43 is of a truly wonderful shape. A few simple directions would enable a boy to make an electroscope for himself which would be both sensitive and useful. As a statement of facts and theories the book may be recommended. It is not a practical guide, and, to do the author justice, he does not pretend that it is.

Notes on the Early Church. By Rev. R. O. Thomas, F.E.I.S. Thomas Murby.

This little volume is prepared for theological students and others. It covers the period from 64 to 500, but at the beginning we have a valuable introductory sketch as to the condition of the nations of the world at the birth of Christ.

This chapter includes, amongst other things, the teaching of the different philosophical sects, concluding with the principles of the Gnostic Philosophy.

At the end of each chapter, which correspond to the centuries, there is a *résumé* for self-examination, and at the end of the little volume there are some 64 questions on the subject, extracted from University and Ordination Papers. We venture to think these questions might be multiplied with great advantage, and a few model answers given.

What Books to Lend and What to Give. By Charlotte M. Yonge. National Society.

This book is a very happy thought of the gifted and learned writer whose name it bears.

Truly does she say, Books are a necessity among the appliances of parish work. If boys and girls and young men and women cannot get good healthy books they will get bad ones, hence the necessity for care in the matter.

There is a very able distinction drawn between the kind of books to lend and the kind to give; the latter, the writer says, which are read and re-read and passed on to younger generations of brothers and sisters, and sometimes children, should be more carefully selected than the former, and should always contain some solid valuable advice.

The work is divided into a good many chapters, such as Little Ones, Boys, Mythology, Penny Readings, and at the end of each chapter there is a list of suitable books for such, and these books are all numbered, the numbers being referred to in an index; *e.g.*, supposing one has a copy of 'Rab and his Friends' to give away, one looks it out in the index and finds the number 924 attached to it; in turning to 924, which we easily find on page 113, we there see it is considered a suitable book to be read to people at Penny Readings.

We cannot recommend the book too strongly.

* * *

The Royal Geographical Society have now made their first awards to Students in Training Colleges in accordance with the decision of the Education Department. The Council of the Society offered ten prizes, five to the male students and five to the female students in the colleges in England and Wales. The first prize in each series is a Scholarship value Fifteen Pounds. Mr. J. W. Goodgere, of the Borough Road, and Miss A. E. Alexander, of Whitelands, have obtained these scholarships. Four prizes, to consist of books, are awarded to Mr. F. Baker, Cheltenham; Messrs. H. Grover, Battersea, and J. E. Quarfe, Borough Road, bracketed equal; and Mr. A. J. Berry, Battersea; and four others to Miss A. Eve, Bishop's Stortford; Miss K. Charlton, Lincoln; Miss J. Jones, Warrington; and Miss G. Martin, Chichester. The male competitors are in their first year of residence, as geography is not now generally taken during their second year of training; but the female students gain these prizes at the close of their College course. The almost absolute failure, after an experience of sixteen years, to stimulate the study of geography in the great public schools by the annual award of medals induced the Royal Geographical Society to discontinue these awards in 1885, and the diversion of their funds for the benefit of those who directly influence the masses of the people is more likely to secure the object chiefly desired. The scheme as affecting teachers is capable of extension and possibly, by the co-operation of the Department, pupil teachers may hereafter find during or at the close of apprenticeship valuable prizes as rewards for their study of geography. The British people should not be ignorant of a subject so helpful to commerce, and any effort on the part of the Royal Geographical Society to popularise the subject is worthy of commendation and support.

The 'Practical Teacher' Sale and Exchange Column.

Owing to numerous requests, we have been induced to start this Exchange Column for the benefit of our readers. We shall be glad to insert announcements relating to the 'Sale or Exchange' of books, etc., at the rate of One Penny per line, *prepaid.*

On Sale.—Practical Teacher, Vols. V., VI., VII., in Parts. II., III., IV. half-bound leather, Vol. I. publisher's cloth; all very good condition.—D. B., Park Place, Keighley.

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Technical Instruction in Elementary Schools.

BY SIR PHILIP MAGNUS.

III. MANUAL TRAINING—DRAWING, AND MODELLING.

IF education is to prepare us for complete living, the instruction given in our elementary schools must do more for our children than place them in a position to gain information through the medium of books. Hitherto, this seems to have been too exclusively its end. It has been often said that if you enable a child to read, and to understand what he reads, you place him in a position to gain, by his own efforts, any further amount of knowledge, and that the duty of the State, so far as education is concerned, is thereby discharged. But this view of the functions of education is too limited. Reading is not the only, nor indeed the chief key to knowledge. Reading can only give us facts and truths at second hand. No education is complete, how elementary soever it may be, which does not show us the methods by which knowledge has been created, and give us some training in their use. Observation and experience are the instruments of knowledge which we employ continuously through life; and education, if it is to fulfil its purpose, must prepare us to use these instruments. The recognition of this fact brings into prominence the importance of the early training of our senses and the advantages of exercising the organs we employ in observing and in experimenting.

If we were treating elementary education as a whole, we should have to consider the best means to be adopted for the development of the social and moral faculties of the child, the necessary training for the inculcation of habits of truthfulness, unselfishness, and thrift, and for the formation of character. It is needless to point out that success in life depends as much upon the possession of these qualities as upon the power of acquiring scientific knowledge or technical skill. But our enquiry is limited to the consideration of the subjects and methods of instruction which should be introduced into the curriculum of our public elementary schools, in order that the education provided in them may prove a suitable preparation for *industrial life.*

For this purpose it is now evident that the old literary or 'bookish' education is inadequate, and we have to consider in what way it needs to be supplemented. In the first place, we have to realize the fact that, for the majority of mankind, to live by the sweat of the brow is to live by the labour of the hand; and that the hand is a powerful and delicate instrument, capable at once of answering to the call of the strongest muscles of the body, and of responding to the keenest perception of the eye. It is the instrument of skilled and of unskilled labour; and it is the function of education to adapt it to the uses of the former. The recognition of the importance of cultivating the hand, not only as an instrument of artistic skill, but also as an organ for acquiring knowledge, is a distinguishing feature of modern education. The hand, properly cultivated, helps to convey to the mind accurate information of the external world, and is the instrument by which mental images of form and beauty are impressed upon crude and shapeless matter. It is a channel through which the mind is enabled to perceive the qualities of things, and the implement by which it impresses upon things its own ideas. The artisan who fixes in clay, or wood, or ivory, or silver the forms of beauty projected from his mind is a true poet.

There are many ways in which hand-culture may be made a part of elementary education. The methods of the Kindergarten should be continued. Part of the value of Froebelism lies in its suggestiveness for utilising the hand in acquiring knowledge through things, and in representing in things the pictures of the mind. One of the first and simplest means of cultivating the hand and of making the hand and eye work in harmony is in the teaching of drawing. Educational theory and the needs of practical life alike prove to us that drawing lies at the very root of what we call 'technical' instruction. It seems strange to us that whilst so many subjects should have been taught in our elementary schools the usefulness of which, whether considered from the point of view of educational discipline or of value in practical life, is so very questionable, drawing, which fulfils all the conditions of a subject for school instruction, should have been, in this country, so generally neglected.

There is almost a concensus of opinion among persons who have thought about the subject, as to the necessity of making drawing an obligatory part of elementary education. It is the most important of all the means suggested for the training of the hand and eye; its practical uses in industrial life are universally recognised; and, as mental discipline, its value is attested by the stimulus it affords to the accurate observation of things. As a universal language, it ought to be taught to all. By writing, we are understood by those only who know the language in which we write; but drawing affords a means of expression which all who run may read. To the artisan, drawing is essential that he may be able to receive or to give instructions and to properly understand his own work. To be taught to draw is as essential to a child who is to be employed in any one of the mechanical arts as to be taught to speak or to write. It is one of the three modes of expression which every one should have the opportunity of learning. To make the teaching of drawing obligatory in all elementary schools is the first reform needed to adapt our system of education to the practical requirements of life.

A distinction must be made between freehand and geometrical or linear drawing. All children may and should be taught a little of both; but some children show an aptitude for the former which should be encouraged, and may be the means of determining their future occupation. There are many children, however, who have little or no artistic perceptions; and these, after having learnt the elements of freehand drawing should be permitted to discontinue it for the more essential study of geometrical or linear drawing. If the Kindergarten teaching be followed up without any break, it will be found that the majority of children of the second or third standard will be able to sketch, with more or less accuracy, some of the simpler things they see around them. Very few of these are likely to develop into artists or designers; but all will have derived immense benefit from the habit of looking at things closely and carefully, as they must do to represent them, how imperfectly soever, on paper. The cultivation of the habit of accurate observation which is acquired by drawing, is a part, and a very important part, of the discipline of science; and in this way, and indeed not only in this way, the one study assists the other. But, in order that drawing may yield its full value as a means of mental training, the pupil must be brought face to face with natural objects. It helps him little or nothing that he can copy copies. He must depict things. He must look at things till he knows them, and must acquire the ability to represent them on paper. There is this in common between science-teaching and art-teaching, that both should bring the pupil into immediate contact with nature. It is because drawing may be made the means of directing observation to the form of things that the teaching of it is valuable, apart altogether from the use which the pupil may make of the skill acquired. It is desirable, therefore, that the pupil should be taught from the very first to draw from natural objects. Much difference of opinion has been expressed as to the advantage of letting children commence by drawing from things; but the prevailing practice of the best foreign schools is found to fully support the views of educationists as to the importance of accustoming the child as soon as he can use a pencil or a brush to draw from real objects.

In teaching drawing, the brush should be more generally used than it is at present. Children do not see things in outline, but as occupying a coloured portion of space. They should be taught to represent them as they see them; and should, therefore, be encouraged to draw with the brush in colour. Not only do they thus obtain a more adequate representation of the external object, but the exercise of painting is more interesting to the child than that of outline drawing, and he obtains, in addition to his knowledge of extended form, a knowledge of differences of shade and colour. Many children who show little aptitude or inclination for drawing with the pencil, are pleased and interested by the use of paints; and there is little doubt that drawing would be more generally liked as a study, if the brush were substituted for the pencil in teaching it.

But there is no better way of selecting for further training those children who exhibit any decided art-aptitude than by teaching drawing indiscriminately to all. From those who exhibit such an aptitude, the bulk of industrial designers would be formed. It has been shown by competent authorities that design can be taught more easily than has been generally supposed, and at a much earlier stage of a pupil's progress. With a view to the training of industrial artists, it is a matter of the greatest importance that children should be early taught the principles of design. Much of the Kindergarten practice is exercise in design, and this should be continued in the elementary school. Children showing any special skill in drawing will very naturally afterwards apply that skill in the practice of some handicraft, and will thereby add beauty to every piece of work that passes through their hands. Notwithstanding the great development of production due to the application of machinery to nearly every branch of industry, the taste and desire for handwork is on the increase. But such handwork, to be readily saleable, must bear upon it the impress of artistic skill. Moreover, as the ability to create beautiful and suitable designs—not only in materials to be fashioned by the hand, but also in those to be wrought by machinery—depends greatly on the designer's knowledge of the material itself, and of its adaptability to the pattern, the artisan who is familiar with the material, and with the processes by which the design may be reproduced, is better qualified than any one else—provided only he has received a proper training—to become an industrial designer. Here we see the great economic advantage of teaching drawing and design to the children of the working classes, *i.e.*, to our future artisans. If they receive a suitable art training, there is nothing their hand touches which their hand may not beautify. Not only will the worker in metal, wood, or lace, prove the best designer of new patterns to be wrought in these materials, but he may add original grace and beauty to his labour which will enhance considerably its value. It is nothing else than the neglect of art training that has made us as dependent as we have hitherto been on foreign artists for original designs in nearly every kind of material and fabric, and has led to the importation in such large quantities of fancy articles, showing taste and beauty and artistic skill. If our handwork and the products of our machinery are to hold their own in beauty of design with those of other countries, the foundations of artistic training must be laid in our elementary schools. In these schools, every child should be taught the rudiments of drawing, both for the sake of the skill he thereby acquires, and for the discipline the study yields; and also with the view of selecting from the children so taught those who show ability to profit by further training.

But there is another branch of drawing which is equally, if not more, essential as a part of the industrial education of all children, viz., mechanical or linear drawing. Nothing is better worthy of imitation than the methods by which this kind of drawing is taught to children in the schools of France and Belgium. The absence of this instruction has been a serious drawback to our English artisans, very few of whom are able to understand what is known as an ordinary working drawing. Mechanical drawing enables a person to realise not only the outward form, but, in part also, the construction of things. By learning to draw to scale, children may be taught to represent the plan and elevation and different sections of simple objects, and also to read and understand working drawings when placed before them. Such instruction lies at the very root of technical education. Although more essential to boys who are likely to be engaged as carpenters, masons, cabinet makers, mechanics, or in other constructive industries, drawing to scale is scarcely less useful to tailors, shoemakers, and dressmakers. Moreover, whilst there are many children who show no natural aptitude for freehand drawing, and who are altogether wanting in the imagination and in the faculty of representation which might enable them to become successful artists or trade designers, there are none who cannot be taught to use drawing instruments, and scarcely any to whom the instruction will not prove serviceable. Mechanical drawing is a subject of such universal applicability that it can be taught with advantage to children of the most diverse tastes. There is, too, an educational value, as mental discipline, in the instruction, quite apart from its usefulness in the practice of the arts, that fully corroborates the important dictum of Herbert Spencer, which should be exalted into a pedagogic axiom: *The education of most value for guidance, must at the same time be the education of most value for discipline.*

There is another hand-exercise, which, following on Kindergarten practice, should form part of the curriculum of elementary schools, viz., modelling in clay. Modelling may be regarded as the complement of drawing. In its earlier states it is an easier, and is generally found to be a more interesting, exercise. The first efforts of the pupil should of course be directed to the production in clay of a facsimile of some simple solid object, such as an orange or a pear. The resemblance between the object and the model will of course be more easily recognised by the child than between the object and its outline on paper. In the production of the solid model there is a gratification of the sense of power, which affords the child more satisfaction and pleasure than in making a representation of the object on a flat surface. The training of the eye in appreciating form and size is very valuable, as is also the exercise of the hand in translating into the concrete the visual impressions. Anyone who has witnessed the concentration of mind and attention of children engaged in modelling, and their successive efforts to make their model similar in shape and size to the object before them, will realise the value of such lessons as sense exercises. Lessons in modelling may be easily graduated, and, as the pupil advances, he may be taught to model from ordinary drawings, and so to supplement his drawing lessons. The relation between an object and its picture will be best understood, when a child can correctly depict the object on a flat surface, and can, conversely, produce a solid object from its pictorial representation. The skill acquired by modelling lessons is of great practical use in the plastic arts, but as a subject of elementary education its value is greatest as an educational discipline.

The teaching of modelling requires very simple and inexpensive appliances, and it can be taught with equal advantage to boys and girls.

It will be seen that the instruction recommended in this article is essentially a *real* education, its object being to exercise and train the faculties by bringing them into direct contact with *things;* to impart, by means of such exercises, a practical knowledge of the simple properties of things; and simultaneously to facilitate the acquisition of some useful skill. To effect these objects is to educate in the true sense of the word; and although the full purposes of education are not thereby attained, such instruction will be found to go a long way towards fitting a child for the practical work of life.

There are, however, other means of manual training which have yet to be considered.

(To be continued.)

Pestalozzi.

BY THE REV. CANON WARBURTON, M.A.,

Formerly Her Majesty's Inspector of Training Colleges for Schoolmistresses.

CHAPTER III.

At Burgdorf, 1800-4.

We next hear of Pestalozzi at Burgdorf, first in the somewhat unexpected position of assistant to the mistress of the infant department of the 'primary schools' in that town; and, a year later, with three partners, in charge of what we should call a 'proprietary school.'

This was in the winter of 1800, and in the following year Pestalozzi published his third celebrated book, entitled 'How Gertrude teaches her Children.' The title of the book is misleading, for it contains little or nothing specially adapted for the guidance of mothers, and plunges at once into the polemics and the philosophy of education. Nor is the only inconsistency to be found in the title-page. More will be told about this in a later chapter in which some account will be given of Pestalozzi's system; but it has been truly said of the volume in question, that 'it contains educational principles of the highest value and importance, side by side with the most glaring blunders and inconsistencies, and has to be constantly corrected by the common sense of the reader.'

But to return to Pestalozzi's work as a schoolmaster at Burgdorf. John Ramsauer, who at the age of ten years became one of his pupils there, has published a vivid account of his experiences in the institution, from which the following extracts are taken.

'I got about as much regular schooling as the others, namely, none at all; but our master's sacred zeal, his devoted love which made him entirely unmindful of himself, his depressed and anxious state of mind which even struck us children, made the deepest impression on me, and knit my childlike and gratfeul heart to him for ever.

'The instruction which we received was limited to drawing, cyphering and exercises in language. We neither read, nor wrote, nor committed to memory. Take as a specimen of an "Exercise in language, drawn from natural history:"—Pestalozzi would say, and we had to repeat the words after him, while our eyes were fixed, by his express orders, on our drawing, "amphibious animals—crawling amphibious animals—creeping amphibious animals—monkeys, long-tailed monkeys, short-tailed monkeys," and so on. We did not understand a word of this, for not a word was explained, and it was all spoken in such a sing-song tone, and so rapidly and indistinctly that it would have been surprising if any one had understood anything of it: besides he cried out so dreadfully loud, and so incessantly, that he could not hear us repeat after him; our repetition consisted mainly in saying the last word or syllable of each phrase, thus "monkeys—monkeys, or 'keys, 'keys." There was never any questioning, or any recapitulation.

'As Pestalozzi in his zeal did not tie himself to any particular time, we generally went on till eleven o'clock with whatever he had commenced at eight, and by ten o'clock he was always tired and hoarse. We knew when it was eleven by the noise of other school-children in the street, and then we all ran off without bidding him good-bye.

'The first time that I was taken into Pestalozzi's school he cordially welcomed and kissed me. He then quickly assigned me a place, and the whole morning did not speak another word to me, but kept on reading out sentences without pausing for a moment. As I did not understand a bit of what was going on, when I heard the word 'monkey,' 'monkey,' come every time at the end of a sentence, and as Pestalozzi, who was very ugly, ran about the room as if he was wild, without a coat, and without a neckcloth, his long shirt-sleeves hanging down over his hands, which swung negligently about, I was seized with real terror, and might soon have believed that he himself was the monkey. During the first few days, too, I was all the more afraid of him, because he had, on my arrival, given me a kiss with his strong prickly beard, the first kiss which I remember having received in my life.'

We may be inclined to smile at this only too graphic picture of the oddities of Pestalozzi, but it is given with perfect simplicity by Ramsauer, whose heart had been completely won by the kindness, and whose respect by the nobility of character of the great teacher. Meanwhile the fame of the institution grew rapidly. Numbers of visitors came from all parts of Switzerland to witness the practical working out of the principles enunciated in 'How Gertrude Teaches her Children'; and at the end of three years the school's utility and success were so generally acknowledged that, though conducted as a private adventure, it began to receive small grants from the public funds.

But once more Pestalozzi's evil star prevailed; the Directional Government of Switzerland was dissolved by Napoleon and the old constitution of the Cantons restored. The new Bernese administration fixed on Burgdorf Castle for local headquarters, and the school had to clear out of it on the 22nd of August, 1804. Pestalozzi attended as one of a deputation to Paris elected to represent to 'the First Consul' the 'wants of Helvetia,' but his educational projects altogether failed to attract the interest of Napoleon, who flatly told the discomfited enthusiast that 'He was not going to mix himself up with the teaching of the A B C.' Another member of the mission was the celebrated educationist Fellenberg, who four years before had founded his well-known school at Hofwyl.

Pestalozzi and Fellenberg.

When the Bernese authorities turned Pestalozzi out of Burgdorf Castle, they gave up to him the monastry of Buchsee, adjoining which was Fellenberg's estate of Hofwyl, and to him, 'Not indeed without my consent,' says Pestalozzi, 'but to my intense mortification, was handed over the general direction of my school.'

Fellenberg possessed in an eminent degree what Pestalozzi so grievously lacked—namely, practical administrative ability. But when, in 1840, this school at Hofwyl was visited by Sir James Kay-Shuttleworth—an honoured name in the history of English Education—Fellenberg admitted that he owed everything to Pestalozzi. In the former the intellect prevailed, in the latter the feelings: under Fellenberg better order was maintained, but love was missing. His hand was found to be too heavy on the reins, and Pestalozzi, receiving an urgent invitation from the inhabitants of Yverdun in the Canton of Vaud, migrated thither in 1805 with his school and the whole of his staff, 'for the teachers,' he tells us, 'found the government of Fellenberg far more distasteful that the want of government under me.'

At Yverdun.

Pestalozzi was now, at the age of fifty-nine, at the height of his reputation. Yverdun soon came to be recognized as a European training school for teachers. 'Pestalozzian schools' were established at Naples, Madrid, and St. Petersburg. In our own island the well-known educational reformers Bell and Lancaster had adopted several features of his system, and many philosophic writers saw in Pestalozzi and his labours 'the commencement of the renovation of humanity.'

But with all this, the migration to Yverdun marks the commencement of the period of Pestalozzi's greatest unhappiness. 'The institution,' he tells us, 'bore within itself the seeds of its own internal decay in the unequal and contradictory character of the abilities, opinions, inclinations, and claims of its members.' But for the present all seemed bright. One hundred and thirty-seven pupils, of ages varying from six to seventeen, lived in the institution, and twenty-eight lodged in the town, making 165 pupils in all. Among them there were seventy-eight Swiss, the rest were English, Germans, French, Russians, Italians, Spaniards, and Americans. Fifteen teachers resided in the buildings, nine of whom were Swiss, and had been educated under Pestalozzi's eye. A visitor to Yverdun thus describes the externals of the institution:—

'The situation of the old castle, with its four great towers enclosing a courtyard, is extremely beautiful. A broad meadow lies between it and the glorious Lake of Neufchatel, on the west side of which rises the mountain range of the Jura, covered with vineyards. We met a multitude of boys, who conducted us to Pestalozzi. His dress was the extreme of untidiness. He had on a threadbare old gray overcoat, and a pair of breeches to correspond, with no waistcoat, and his stockings hanging down over his slippers—his coarse, bushy, black hair unkempt and frightful. His forehead was deeply wrinkled, his dark brown eyes now soft and tender, now full of fire. You hardly noticed that the old man, so kindly and genial, was ugly; you read in his singular features long-continued suffering and great hopes.'

The internal condition of the school is thus described by Pestalozzi himself, but it is to be feared—and indeed he subsequently admitted the fact himself—that he saw things through rose-coloured spectacles, and as he would have wished to have them, rather than as they were. 'A pure paternal and fraternal feeling everywhere shines forth. The children feel themselves free, and their activity finds a powerful charm in their employments. The life in the house is to a rare extent a school for cultivating domestic affection and domestic unity. The disposition of the great body of our inmates is good: a spirit of strength, of repose, and of endeavour rests on the whole. Some pupils evince an angelic disposition, full of love, and of a presentiment of higher thoughts and of a higher existence. The bad ones do not feel themselves comfortable in the midst of our life and labour; on the other hand, every spark of good and noble feeling which still glimmers even in the bad ones is encouraged and developed. The children are neither hardened by punishment nor made vain and superficial by rewards. Their feelings are not lightly wounded; the weak are not made to compare themselves with the strong, but with themselves. We never ask a pupil if he can do what another can, we only ask him if he can do a thing, but we always ask him if he can do it perfectly. We live altogether united in brotherly love, free and cheerful, and are, in respect of that which we acknowledge as the one thing needful, one heart and one soul.'

It may be well to set side by side with this report (in which the indicative appears to be sometimes used instead of the optative mood) some passages from the dispassionate report of the five commissioners sent down by the Swiss Diet at Freiburg to examine the school. 'This institution in no way aims at coming into close connection with our establishments for public instruction. Determined at any price to interest all the faculties of children in order to direct their development according to its own principles, it has taken counsel of its own views only, and betrays an irresistible desire to open for itself new paths, even at the cost of never treading in those which usage has now established. This was perhaps the best way which could be chosen for arriving at useful discoveries, but it is also a design which renders harmony with us impossible. The institution pursues its own way, the public schools pursue theirs, and there is no probability that both ways will soon meet. It is to be regretted that the "force of circumstances" has always driven M. Pestalozzi beyond the career which his pure zeal and fervent charity had marked out for him. Let us profit by the excellent ideas which lie at the foundation of the whole undertaking, but let us also lament that an adverse fate must hang over a man who by "the force of circumstances" is constantly hindered from doing what he would wish to do.'

The publication of this report was followed by a long and acrimonious paper war, which brought the institution into discredit by throwing light upon its weakest points. There can be little doubt that the extraordinary prosperity and reputation of the school had turned the heads of the teachers; producing, as Pestalozzi himself admits, 'an audacity of behaviour towards the whole world and towards everything done in education that was not cast in our own mould.' Again with such a medley of children collected from all parts of Europe, the institution had no mother tongue. Prayers were read every morning first in German and then in French. At the lessons in the German language, intended for German children, there were French children to whom every word spoken was unintelligible. Again, despite Pestalozzi's self-deceiving optimism, the life was as unlike home-life as it well could be, and the little boys especially had to endure much hard treatment and privation. But all these drawbacks sink into insignificance when compared with the bitter dissensions which sprang up among the subordinate teachers. The two most prominent members of the staff were Schmid and Niederer. Of the former, a Tyrolese shepherd-boy who had joined him at Burgdorf, 'more rude and unkempt than his master, but with the eyes and beak of a hawk'—Pestalozzi thus writes, 'By his practical talent and indomitable activity he soared above the influence of every other person in the establishment. I looked upon the *strength* of this pupil, though still so young, as the mainstay of the house'; and later, 'Schmid threw a hard shell round the kernel of my vanishing labours and saved me.' These characteristics made Schmid an invaluable element in an institution conducted by a man 'gifted,' as Pestalozzi says of himself, 'with an unrivalled incapacity to govern,' for Niederer also, the second in command, was completely destitute, as he often acknowledged, of practical ability. He was, however, a youth of high culture and lofty intellectual ambition; and seeing in Pestalozzi, as we are told, 'a man who had grasped with instinctive profoundity the subject of human culture, but had given only a fragmentary view of it, and who could not control the ideas which, as it were, possessed him,—Niederer believed that he was himself destined to build up out of those fragments a complete and systematic theory.' Both these men, though each in his way more highly gifted than Pestalozzi, loyally acknowledged him as their master, and submitted to his influence in everything except living on friendly terms with each other.

Pestalozzi's death.

Schmid first seceded and went so far as to write against the institution. When he had been prevailed upon to return, thirteen of the staff withdrew, and with them Niederer, whose desertion, and the circumstances which accompanied it, threw the old man into such a passion of grief and anger that he became delirious, and his reason only slowly returned. For he saw in Niederer 'the one man in the institution who, standing on the pinnacle of German culture, was fitted to gain for the new method its proper place in the region of human culture generally.' Only by such a man, he thought, could the educated world be won over to his plans; by such a man only must his Swiss idiom be translated into

'*High* German,'—nay, for some time he so far agreed with Niederer as to think that 'Niederer understood him better than he understood himself.' And now began a money squabble, leading to a protracted lawsuit between Pestalozzi and the seceding teachers, which brought further discredit and pecuniary loss upon the institution, and poisoned all the remaining days of the old man's life. The lawsuit was decided at the end of seven years, and then Pestalozzi determined to transfer his institution from Yverdun to Neuhof, where he had made his first unsuccessful venture just fifty years before. The very successes of the Yverdun school were a misfortune in Pestalozzi's eyes, because he saw that it had attracted scholars of a much higher social class than those for whom it was originally intended; and he therefore now determined to re-establish the institution in a new situation, on a new basis, and to end his life as he had begun it, in teaching the children of the poor. But on his announcing his intention of doing so, the remaining teachers, who had become ambitious in prosperity, refused to accompany him, and nothing was left for Pestalozzi but to close the school altogether. This he did in 1825, and withdrew alone, impoverished and widowed, at the age of eighty years, to end his days under the roof of his grandson.

He had lost his devoted wife about eight years before this last blow. What a chequered life, but with how much more of shadow than of sunshine,—must she have led for those five-and-forty years; with a husband of such tender affectionateness, such nobility of feeling, such exalted disinterestedness,—but at the same time such an unkempt, thriftless, poverty-stricken, one-idea'd enthusiast as Pestalozzi.

When the customary parting hymns had been sung before the closing of her coffin, the old man turned towards it, and said, 'We were spurned and despised by all; sickness and poverty bowed us down; we ate dry bread with tears. What was it that in those days of trial gave you and me the strength to persevere, and not cast our hope away?' Thereupon he took up a Bible, and laid it on the breast of his dead wife, adding, 'From this source you and I drew courage, and strength and peace.'

Pestalozzi's constitution had been weak from childhood. He had undergone severe illnesses, and met with more than one all but fatal accident, yet he lived to drain the cup of a long and disappointed life; and died as heart-sick, and as nearly heart-broken, as it is possible for a brave and religious man to die. His last conscious moments however were lighted up with a parting gleam of his old brightness and serenity. Calling his friends to stand around his bed, he spoke to them thus: 'I forgive my enemies; may they find peace now that I go to everlasting rest. I should like to have lived another month, to have completed my last labours; but I again thank God, who in His providence calls me away. And you my children, remain in quiet attachment to one another, and seek for happiness in the circle of home.'

He was buried in the little churchyard of Birr on the 19th of February, 1827. Scarcely any persons not of his own family attended his funeral, for the snow lay thick on the ground, and as the interment took place on the second day, the news of his death had reached a very few. But for some time afterwards it was the custom for school children and teachers of the canton of Argovia to come and sing their hymns over his grave.

(*To be continued.*)

Jeanne d'Arc, by Lamartine.

TRANSLATED BY A. M. BOWER,

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CHAPTER VI.— *continued.*

JEANNE D'ARC.	JOAN OF ARC.
Un cri d'horreur s'élève	A cry of horror rises
de toute la France,	from the whole of France,
et surtout à Paris	and especially at Paris
vendu aux Bourguignons.	sold to the Burgundians.
On accuse le Dauphin,	They accuse the Dauphin,
innocent du crime des Armagnacs	innocent of the crime of the Armagnacs
qui avaient frappé seuls,	who alone had struck,
pour prévenir la réconciliation	in order to prevent the reconciliation
des deux princes.	of the two princes.
Isabeau, qui accuse elle-même son fils,	Isabeau, who herself accused her son,
se fait enlever par les Bourguignons	caused herself to be carried off by the Burgundians
de la captivité	out of the captivity
où la retenaient les Armagnacs à Tours.	in which the Armagnacs detained her at Tours.
Les Bourguignons et la reine	The Burgundians and the queen
se liguent avec les Anglais	form a league with the English
maîtres de la moitié du royaume.	masters of half the kingdom.
Elle rentre avec eux dans Paris,	She enters with them into Paris,
sur les cadavres de deux mille Parisiens	over the corpses of two thousand Parisians
immolés à la vengeance de Montereau.	sacrificed to the vengeance of Montereau.
Elle donne sa fille à Henri V,	She gave her daughter (in marriage) to Henry V.,
roi d'Angleterre.	king of England.
Les Parisiens, ivres de la popularité	The Parisians, intoxicated with the popularity
du nouveau duc de Bourgogne,	of the new Duke of Burgundy,
proclament, à l'instigation de ce vassal,	proclaim, at the instigation of this vassal,
le roi d'Angleterre régent	the king of England regent
pendant la vie de Charles VI,	during the life of Charles VI.,
et roi de France	and king of France
après la mort de l'insensé.	after the death of the mad king.
Le Dauphin, proscrit par ses oncles	The Dauphin, proscribed by his uncles
et par sa mère,	and by his mother,
erre de province en province,	wandered from province to province,
déclaré coupable d'un crime	proclaimed guilty of a crime
qu'il n'a pas commis.	which he had not committed.
Le roi d'Angleterre vient	The king of England came
prendre possession de la régence à Paris.	to take possession of the regency in Paris.
Deux Frances, deux rois, deux régences,	Two Frances, two kings, two regencies,
deux armées, deux gouvernements,	two armies, two governments,
deux nations, deux noblesses,	two nations, two nobilities,
deux justices sont face à face ;	two (systems of) laws confront each other ;
père, fils, mère, oncles,	father, son, mother, uncles,
neveux, concitoyens, étrangers,	nephews, fellow citizens, foreigners,
se disputent le droit, le sol, le trône, les villes,	fight for the right, the soil, the throne, the towns,

les dépouilles, le sang de la nation.	the spoils, the blood of the nation.
La mort enlève le roi d'Angleterre à Vincennes ;	Death carried off the king of England at Vincennes,
Charles VI le suit au tombeau,	Charles VI. followed him to the tomb,
père de douze enfants d'Isabeau,	the father of the twelve children of Isabeau,
et ne léguant le royaume	and only leaving the kingdom
qu'à l'étranger et à l'anarchie.	to the foreigner and to anarchy.
Le duc de Bedford prend insolemment	The Duke of Bedford insolently assumed
la régence au nom de l'Angleterre,	the regency in the name of England,
poursuit la poignée de nobles	pursued the handful of noblemen
qui veulent rester Français avec le Dauphin,	who had resolved to remain French with the Dauphin,
les défait à la bataille de Verneuil,	defeated them at the battle of Verneuil,
exile la reine, devenue un embarras du règne	exiled the queen (who had) become a source of embarrassment to the kingdom
après avoir été un instrument d'usurpation ;	after having been an instrument of usurpation ;
concentre les armées de l'Angleterre,	concentrated the armies of England,
de la France et de la Bourgogne	of France and Burgundy
autour d'Orléans, défendue	round Orleans, defended
par quelques milliers de partisans du Dauphin,	by a few thousands of the followers of the Dauphin,
et qui contient presque seule	and which contains almost alone
ce qui reste du royaume de France.	what remains of the kingdom of France.
Les terres sont ravagées	The land was ravaged (devastated, plundered)
sur tout le territoire	over the whole country
par le flux et le reflux	by the movements backwards and forwards
de ces bandes tantôt amies	of these bands sometimes friendly,
tantôt ennemies,	sometimes hostile,
et qui se chassent	and who drive each other onwards
comme le flot le flot,	as wave drives wave,
en saccageant les moissons,	at-the-same-time (en) destroying the harvests,
en brûlant les villes,	burning the towns,
en dispersant, pillant, violant,	driving away, plundering, violating,
massacrant les populations.	massacring the people.
Pendant cet évanouissement de la patrie,	During this stupor (weakening) of the country,
le jeune Dauphin, tantôt réveillé	the young Dauphin, at times aroused
par les cris du peuple,	by the outcries of the people,
tantôt assoupi dans les plaisirs de son âge,	at others buried in the pleasures of his age,
s'enivrait d'amour pour Agnès Sorel	was enraptured with love for Agnes Sorel
au château de Loches.	at the castle of Loches.
Cette femme adorée d'un jeune roi	This woman worshipped by a young king
sans royaume rougissait pour elle-même	without a kingdom blushed for herself
et pour lui d'un bonheur sans gloire.	and for him at their happiness without glory.
Ayant fait venir, une nuit,	One night having sent for
un devin dans le château pour interroger	a soothsayer to the castle to consult
la fortune sur sa destinée	fortune on her destiny
en présence du Dauphin, le devin,	in presence of the Dauphin, the soothsayer,
pour flatter son cœur ou son ambition,	in order to flatter her heart or her ambition,
lui prophétisa qu'elle serait un jour	prophesied that she would one day be
l'épouse du plus grand roi de la terre.	the wife of the greatest king in the world.
'S'il doit en être ainsi,	'If it is to be so,
dit Agnès Sorel en se levant	said Agnes Sorel rising at-the-same-time (en)
et en s'adressant au Dauphin,	and addressing the Dauphin,
il faut que je sorte et que j'aille	I must leave and go
de ce pas épouser le roi d'Angleterre ;	instantly and marry the king of England ;
car, en la langueur	for, in the effeminacy
qui vous enchaîne ici,	which chains you here,
je vois trop que vous ne serez pas	I see too well that you will not
longtemps le roi de France.'	long be king of France.'
Le Dauphin versa des larmes de honte,	The Dauphin shed tears of shame,
surmonta son amour et reprit la campagne.	overcame his love and resumed the campaign.
Seul prince peut-être	The only prince perhaps
en qui l'amour ait conseillé	in whom love counselled
le devoir et réveillé la vertu !	duty and awoke virtue !
Ainsi, le roi cherchant en vain	Thus, the king seeking in vain for
ses sujets dans son peuple,	his subjects among his people,
le peuple cherchant en vain	the people seeking in vain for
son roi dans la monarchie,	their king in the monarchy,
le Français cherchant en vain	the Frenchman in vain seeking for
une patrie dans la France :	his fatherland in France ;
tel était l'état de la nation,	such was the state of the nation,
quand la Providence lui révéla	when Providence revealed to it
son salut dans une enfant.	its salvation in a child.

VII.

Il y avait en ce temps-là à Domremy,	There was at this time at Domremy,
village de la haute Lorraine champenoise,	a village of Upper Lorraine adjoining-Champagne,
sur le penchant boisé des Vosges,	on the woody slope of the Vosges,
non loin de la petite ville de Vaucouleurs,	not far from the small town of Vaucouleurs,
une famille dont le nom était d'Arc.	a family whose name was D'Arc.
Le père de famille était	The father of the family was
un simple laboureur, mais un laboureur	a simple farmer, but a farmer
qui cultivait son propre héritage	who cultivated his own property,
et dont le toit, bâti et possédé	and whose house, built and owned
par ses pères, devait appartenir à ses fils.	by his fathers (ancestors), would belong to his sons.
Si l'on en juge par les mœurs	If we may judge of it by the manners
et par les habitudes domestiques de la famille,	and by the domestic habits of the family,
il y avait dans cette maison de paysans	there was in this peasant home
le loisir et la piété que donne l'aisance,	the leisure and the piety which ease gives,
et cette noblesse de cœur et de front	and that nobility of heart and features
qu'on retrouve en ceux	which we find in those
qui cultivent la terre paternelle	who cultivate their patrimonial estates
plus qu'en ceux qui travaillent	rather than in those who work
dans l'atelier d'autrui,	in the workshops of others

parce que la possession d'un coin de terre,	because the possession of a corner (plot) of land,
quelque petit qu'il soit,	however small it may be,
conserve au paysan l'indépendance	preserves in the peasant his independence
de l'âme en lui faisant sentir	of mind by making him feel
qu'il tient son pain de Dieu.	that he derives his sustenance from God.
Le père s'appelait Jacques d'Arc ;	The father was called Jacques d'Arc ;
la mère, Isabelle Romée,	the mother, Isabelle Romée,
surnom qu'on donnait	a surname that was given
dans ces contrées aux pèlerines	in these countries to pilgrims
qui étaient allées à Rome	who had been to Rome
visiter les pieux tombeaux des martyrs.	to visit the sacred (pious) tombs of the martyrs.
Ils avaient trois enfants :	They had three children :
deux fils, l'un nommé Jacques	two sons, one called Jacques (James)
comme son père, l'autre Pierre,	after his father, the other Pierre (Peter),
et une fille venue au monde après ses frères	and a young girl come (born) into the world after her brothers
et qui portait le nom de Jeanne,	and who bore the name of Jeanne (Jane or Joan),
bien que sa marraine lui eût donné	although her godmother would have given her
aussi le nom de Sibylle.	also the name of Sibylle (Sibyl).
Un soc de charrue,	A ploughshare,
armoirie du laboureur,	the peasant's coat of arms,
était grossièrement sculpté	was rudely carved
sur le linteau de pierre	on a stone lintel
au-dessus de la porte de la chaumière.	above the cottage door.
Le père et les deux fils cultivaient les champs ;	The father and the two sons cultivated their fields ;
ils soignaient les attelages de leurs charrues,	they attended to their plough-horses,
dans cette contrée où on laboure	in this part of the country where they plough
avec des chevaux aussi propres	with horses as suitable
à la guerre qu'au sillon.	for war as for the furrow.
La mère restait à la maison	The mother stayed at home
pour garder le seuil et surveiller le foyer.	to guard the threshold and look after the housework.
Elle était assez riche	She was rich enough
pour s'occuper seulement	to busy herself only
des soins domestiques et intérieurs,	with home and domestic cares,
sans tenir elle-même la faucille	without herself handling the sickle
et se charger du fardeau des gerbes.	and carrying the sheaves.
Elle élevait sa fille	She brought up her daughter
dans la même condition de loisir	in the same state of ease
qu'elle avait elle-même chez son mari.	as she herself enjoyed with her husband.
Bien que Jeanne,	Although Joan,
dans sa première enfance,	in her earliest years,
jouât et s'égarât au bord des bois	played and strayed on the border of the woods
avec les petites filles du village,	with the little village girls,
sa mère ne l'employa jamais	her mother never employed her
comme bergère à garder les troupeaux.	as a shepherdess to guard the flocks.
Elle ne savait ni lire ni écrire,	She could neither read nor write,
et ne pouvait lui enseigner	and could not teach her
ce qu'elle ignorait ;	what she herself did not know ;

mais elle l'entretenait	but she would teach her
de choses honnêtes et pieuses	good and pious things
qu'une mère de famille	which the mother of a family
verse par tradition	pours by tradition
dans la mémoire de son enfant.	into the memory of her child.
Elle lui apprenait à coudre	She taught her to sew
avec cette perfection qui est l'art domestique	with that perfection which has been the domestic art
des jeunes filles depuis l'antiquité.	of young girls from antiquity.
Jeanne était devenue si habile dans ces travaux sédentaires de l'aiguille,	Joan had become so skilful in this sedentary needlework,
qu'aucune matrone de Rouen,	that no matron of Rouen,
dit-elle elle-même,	she herself said,
n'aurait pu rien lui remontrer de plus	could have shown (taught) her anything more
de ce métier où Rouen excellait alors.	of that art (trade) in which Rouen at that time excelled.
Elle filait aussi les toisons	She spun also the fleece
ou le chanvre à côté de sa mère.	or hemp by her mother's side.
Elle recevait d'elle seule	She received from her alone
les instructions de l'église.	her religious instruction.
'Aucune fille de son âge	'No daughter of her age
et de sa condition,	and station,
dit une de ses compagnes	says one of her companions
interrogée sur cette enfance,	(when) interrogated about her (Joan's) infancy,
n'était tenue plus amoureusement	was more lovingly cherished
dans la maison de ses parents.	in the house of her parents !
Que de fois j'allai chez son père !	How often did I go to her father's !
Jeanne était une fille simple et douce.	Joan was a simple and gentle girl.
Elle aimait à aller à l'église	She was fond of going to church
et aux saints pèlerinages.	and on sacred pilgrimages.
Elle s'occupait du ménage	She spent her time in household matters
comme les autres filles.	like other young girls.
Elle se confessait souvent.	She often went to the confessional.
Elle rougissait de honte honnête	She blushed with modest shame
quand on la raillait sur sa piété	when they rallied her on her piety
et sur ce qu'elle aimait trop	and on being too fond
à prier dans les sanctuaires.	of praying in the sanctuaries.
Elle était aumônière et charitable.	She was charitable and fond of giving alms.
Elle soignait les enfants malades	She nursed sick children
dans les chaumières voisines de la maison de sa mère.'	in the cottages near her mother's house.'
Un pauvre laboureur du pays disait	A poor country labourer said
à ses juges qu'il se souvenait	to her judges that he remembered
d'avoir été veillé ainsi par elle	having been nursed thus by her
quand il était enfant.	when he was a child.

Grammatical Notes, Questions, Sentences, and Pieces for Translation to Jeanne d'Arc.

Parse :—La passion du citoyen pour sa patrie se compose de toutes les passions personnelles ou désintéressées dont Dieu a pétri le cœur humain : amour de soi-même, et défense du droit sacré que tout homme venant en ce monde a d'occuper sa place au soleil sur la terre.

La—def. art., sing., fem., agreeing with passion.

passion—abst. noun, sing., fem., nom. case to verb compose.

du = *de le*—def. art., gen. case, sing., masc., agr. with citoyen.

citoyen—noun, sing., masc., genitive case, governed by passion.

pour—prep. gov. patrie.

sa—conjunctive poss. adj. pron., sing., fem., 3rd pers., agr. with patrie.

patrie—noun, sing., fem. gov. by pour.

se—reflex. pron., sing., fem. (= passion), acc. case, gov. by compose.

compose—reflex. verb, regular, act., indic., pres., 3rd., sing., agreeing with nom. passion.

de—prep. gov. passions.

tout-e-s—indef. adj. pron., plur., fem., agr. with passions.

les—def. art., plur., fem., agr. with passions.

passions—abst. noun, plur., fem., gov. by de.

personel-l-e-s—adj., plur., fem., agreeing with passions.

ou—disj. conjunction.

désintéressé-e-s—adj., plur., fem., agr. with passions.

dont—rel. pron., genit. case, plur., fem. (= passions), gov. by a pétri.

Dieu—noun, sing., nom. to aux. verb a.

a—aux. verb, irreg., indic., pres., 3rd, sing, agr. with Dieu.

pétri—past part. of pétrir, sing., masc.

a pétri—is the passé indéfini (past indefinite) tense of pétrir.

le—def. art., sing., masc., agr. with cœur.

cœur—noun, sing., masc., gov. by a pétri.

humain—adj., sing., masc., agr. with cœur.

amour—abst. noun, sing., masc.: no art. because in apposition to passion.

de—prep. gov. soi-même.

soi-même—disj. indef. reflex. pron., gov. by de.

et—conj.

défense—abstr. noun, sing., fem. : no art., in apposition to passion.

du—def. art., gen., sing., masc., agr. with droit.

droit—abstr. noun, sing., masc., gov. by défense.

sacré—adj., sing., masc., agr. with droit.

que—rel. pron., sing., masc. (= antecedent droit), accus., gov. by aux. verb a.

tout—indef. adj. pron., sing., masc., agr. with homme.

homme—noun, sing., masc., nom. to aux. verb a.

venant—pres. part. of irreg. verb venir.

en—prep. gov. monde.

ce—dem. adj. pron., sing., masc., agr. with monde.

monde—noun, sing., masc., gov. by en.

a—aux. verb, irreg., indic., pres., 3rd, sing., agr. with homme.

d'occuper—de prep., occuper verb infin., gov. by droit.

sa—conj. poss. adj. pron., sing., fem., 3rd pers., agr. with place.

place—noun, sing., fem., accus. case, gov. by occuper.

au (= *à le*)—def. art., dative case, sing., masc., agr. with soleil.

soleil—noun, sing., masc., dat. case.

sur—prep. gov. terre.

la—def. art., sing., fem., agr. with terre.

terre—noun, sing., fem., gov. by prep. sur.

CHAPTER I.

Aussi—a-t-il enfanté. When a sentence begins with aussi, peut-être, à peine, etc., the nom. is placed after the verb. *En* serait-il autrement? Here *en* is pleonastic. Les *actes* sont *proportionnés*. Once for all we will here give the three principal rules for the agreement of the past participle. Rule I.—If the past part. comes after any tense of the verb être the past part. must agree in gender and number with the subject of être, as : l'homme est (était, fut, sera, serait, a été, avait été, aura été, aurait été) aimé. Les hommes sont (étaient, furent, seront, etc.) aimés. La femme est (était, etc.) aimée. Les femmes sont (étaient, etc.) aimées. Rule II.—The past part. remains indeclinable if conjugated with the verb *avoir*, as : L'homme a aimé ; les hommes ont aimé ; la femme a aimé ; les femmes ont aimé. Rule III.—If an accusative case precedes the verb avoir, the past participle must agree in gender and number with that accusative, as : Je l'ai vu = I have seen him (le). Je l'ai vu-e = I have seen her (la). Je les ai vu-s = I have seen them (the men). Je les ai vu-es = I have seen them (the women). L'homme *que* (accus., masc., sing.) j'ai vu. Les hommes *que* (accus., masc., plur.) j'ai vu-s. La femme *que* (accus., fem., sing.), j'ai vu-e. Les femmes *que* (accus., fem., plur.) j'ai vues. Les lettres que j'ai écrit-es. Quelle faute (accus., sing., fem.) ai-je commis-e? Quelles fautes ai-je commis-es? Qui nous ont emmaillottés ; the past part. is masc., plur., to agree with the accus. *nous* before the verb *ont* (Rule III., above) ; *pour qu'* un progrès social *soit*: words meaning *in order that*, introducing final sentences, take the subjunctive. La première condition, c'est que ce peuple *soit*: *soit* is subj. after the superlative *première*.

CHAPTERS II., III., IV.

To be right (thirsty, sleepy, afraid, ashamed, etc.) = avoir raison (soif, sommeil, peur, honte). Qu'elle s'appelle Judith. Note the following meanings of *que*: en l'état *qu'*ils sont = in the condition *in which* they are. Un moment viendra *que* = a time will come *when*. Si vous alliez à Paris et *que* vous voulussiez, etc, = if you were going to Paris and if (= que which always takes subj. when it means if) you would, etc. Que = pourquoi in: *que* ne répond-il = *why* does he not reply? Que = comme in : *que* vous êtes heureux = *how* fortunate you are. Que = combien in : *que* de bonheur j'ai eu = *how much* happiness I have had! Que = quoique in : *quoiqu'* une partie du monde cherche à tromper and *que* l'autre, etc. = *although* one half of the world tries to deceive and *although* the other, etc. Que = soit que in: *qu'*il perde ou *qu'*il gagne = *whether* he loses or *whether* he gains. Se trompa d'arme; lit. = deceived itself in its weapon. Jeanne d'Arc ne s'arma que de; lit. = only armed herself with.

CHAPTER V.

Ne se pose seulement pas; lit. = does not set to itself only. Un grand homme = an eminent man; un homme grand = a tall man. On s'y éblouit et on s'y brûle; lit. = one dazzles oneself in it and one burns oneself therein.

CHAPTER VI.

1409 = mil quatre cent neuf. In dates we write mil not mille. Cent and quatre-vingts when followed by a number do not take s. We omit *in* and *and* in dates. 1409 = also quatorze cent neuf. Se décomposait, lit. = disintegrated herself. Echapper de = to flee from; échapper à = to avoid; s'échapper de, always. S'étaient-enduits = had covered themselves. Reflexive verbs use the auxiliary verb *être*; we use *to have*. Translate the tenses of *être* by the corresponding tenses of *avoir*, thus :

I *have* washed myself = je me *suis* (not *ai*) lavé.
I *had* washed myself = je m'*étais* (not *avais*) lavé.
I shall have washed myself = je me *serai* (not *aurai*) lavé.
I should have washed myself = je me *serais* (not *aurais*) lavé.
I may have washed myself = je me *sois* (not *aie*) lavé.
I might have washed myself = je me *fusse* (not *eusse*) lavé.

Leur enlevait l'exploitation; verbs of *taking away* govern the dative case. Se dénouaient; lit. = untied themselves. Ils osent l'immoler: oser, pouvour, vouloir, place no prep. after them before following infin. Il s'essaie; lit. = he tries himself, *i.e.*, his strength. S'enivrait d'amour; lit. = intoxicated himself with love. Devin, fem. devineresse. Devin, fem. devineuse = guesser. S'il doit *en* être ainsi: *en* is here pleonastic. De ce pas; lit. = with this step. Seul prince; no art. because it is in apposition with *le* dauphin. En qui l'amour *ait*; *ait* is subj. after *seul*. Enfant (masc.) may be equally well applied to a child of either sex.

(To be continued.)

———o———

Pupil Teacher Examination Papers (Scotland).

25th February 1888.

CANDIDATES.

FIRST PAPER.

(*Two hours and a half allowed for this Paper.*)

Dictation.

Write from dictation, in a neat hand with correct spelling and punctuation, the passage read by the Inspector.

Arithmetic.

MALES.

1. Find, by practice, the value of 127 tons 13 cwt. 3 qrs. 14 lbs. of steel rails at £13 10s. per ton.

	£	s.	d.			
	13	10	0	= cost of 1 ton		
		127				
	1714	10	0	=	,,	127 tons
10 cwt. = ½ of 1 ton	6	15	0	=	,,	10 cwt.
2 ,, = ⅕ of 10 cwt.	1	7	0	=	,,	2 cwt.
1 ,, = ½ of 2 cwt.	0	13	6	=	,,	1 cwt.
2 qrs. = ½ of 1 cwt.	0	6	9	=	,,	2 qrs.
1 qr. = ½ of 2 qrs.	0	3	4½	=	,,	1 qr.
14 lbs. = ½ of 1 qr.	0	1	8¼	=	,,	14 lbs.
	1723	17	3¾	=	,,	127 tns. 13 ct. 3½ qrs.

2. A bankrupt's debts exceed his property, which is worth £1,736, by the sum of £504; how much can he pay in the £?

debt debt
£2,240 : £1 :: £1,736 : x.

$$\frac{\pounds 1{,}736}{2{,}240} = \underline{15s.\ 6d.}\ \text{Ans.}$$

3. If 2 tons 2 cwt. 3 qrs. be carried three miles for 18s. 9¾d., how far ought 6 cwt. 3 qrs. to be carried for the same money?

6 cwt. 3 qrs. : 2 tons 2 cwt. 3 qrs. :: 3 mls. : x.
or or
27 qrs. 171 qrs.

$$\frac{3\ \text{mls.} \times 171}{27} = \underline{19\ \text{mls.}}\ \text{Ans.}$$

4. If the carriage of 7 cwt. 44 lbs. for 140 mls. be £1 18s. 4d., what weight can be carried 126 mls. for 13s. 5d.?

£1 18s. 4d. : 13s. 5d.
or or
460s. : 161s.
126 mls. : 140 mls.
:: 7 cwt. 44 lbs. : x.

$$\frac{828\ \text{lbs.} \times 161 \times 140}{460 \times 126} = 315\ \text{lbs.} = \underline{2\ \text{cwt.}\ 3\ \text{qrs.}\ 7\ \text{lbs.}}\ \text{Ans.}$$

FEMALES.

1. Find, by practice, the price of 3 acres 3 roods 25 poles of land at the rate of £120 per acre.

	£	s.	d.			
	120	0	0	= cost of 1 acre		
			3			
	360	0	0	=	,,	3 acres
2 ro. = ½ of 1 ac.	60	0	0	=	,,	2 ro.
1 ro. = ½ of 2 ro.	30	0	0	=	,,	1 ro.
20 po. = ½ of 1 ro.	15	0	0	=	,,	20 po.
5 po. = ¼ of 20 po.	3	15	0	=	,,	5 po.
	468	15	0	=	,,	3 ac. 2 ro. 25 po.

2. Make out in proper form and duly receipt a bill for—
9 lbs. tea at 2½d. per ounce,
36 apples, 3 to the lb., at 5½d. per lb.,
1,000 eggs at 4 for 3½d.
76 lbs. butter at £6 10s. 8d. per cwt.

Edinburgh, 25th Feb., 1888.

Mrs. Hamilton,
Bought of Samuel Scott.

	£	s.	d.
9 lbs. tea at 2½d. per oz.	1	10	0
36 apples, 3 to the lb., at 5½d. per lb.	0	5	6
1,000 eggs at 4 for 3½d.	3	12	11
76 lbs. butter at £6 10s. 8d. per cwt.	4	8	8
	£9	17	1

Paid 25th Feb. 1888.
£9 17s. 1d.
Samuel Scott.

3. Find, by practice, the value of 27 cwt. 3 qrs. 6 lbs. at £22 8s. per cwt.

	£	s.	d.			
	22	8	0	= cost of 1 cwt.		
		27				
	604	16	0	=	,,	27 cwt.
2 qrs. = ½ of 1 cwt.	11	4	0	=	,,	2 qrs.
1 qr. = ½ of 2 qrs.	5	12	0	=	,,	1 qr.
4 lbs. = ⅐ of 1 qr.	0	16	0	=	,,	4 lbs.
2 lbs. = ½ of 4 lbs.	0	8	0	=	,,	2 lbs.
	622	16	0	=	,,	27 cwt. 3 qrs. 6 lbs.

4. What is the cost of 7 tons 15 cwt. of bell metal at £7 16s. per cwt.?

	£	s.	d.			
	155	0	0	= cost at £1 per cwt.		
			7			
	1,085	0	0	=	,,	£7 ,,
10s. = ½ of £1	77	10	0	=	,,	10s. ,,
4s. = ⅕ of £1	31	0	0	=	,,	4s. ,,
2s. = ½ of 4s.	15	10	0	=	,,	2s. ,,
	1,209	0	0	=	,,	£7 16s. per cwt.

Grammar.

'The English *delight* in silence *more* than any other European *nation*, if the *remarks which* are made on us by foreigners are true. Our discourse is not kept *up* in conversation, but falls into *more* pauses and intervals than in neighbouring *countries*.'

1. Parse fully the words in italics.

PARSING.

Delight—verb, reg., intrans., act., indic., pres., indef., 3rd pers., plur., agreeing with subj. 'English.'
more—adv. of degree modif. 'delight.'
nation—common noun, neut., sing., nom., subj. of (*delights*).
remarks—common noun, neut., plur., nom., subj. of 'are.'
which—pro., simple rel., antec. 'remarks,' 3rd pers. plur., neut., nom., subj. of 'are made.'
up—adv. of manner, modif. 'is kept.'
more—adj. of quant., compar. deg. (*much*, *more*, *most*), qual. 'pauses.'
countries—com. noun, neut., plur., obj., gov. by 'in.'

2. What is an abstract noun? Give some of the principal methods of forming them, with examples.

An abstract noun denotes the quality, action, or state of some proper or common noun, considered apart from the thing in which it is found, as whiteness, truth, motion.

Abstract nouns are principally formed from—

(*a*) Adjectives, *e.g.*, *goodness*, *truth*, *justice*, from good, true, just.

(*b*) Verbs, *e.g.*, *speech*, *thrift*, *shrift*, from speak, thrive, shrive.

(*c*) Concrete nouns, *e.g.*, *despotism*, *knavery*, *tyranny*, from despot, knave, tyrant.

3. Analyse the following simple sentences :—

(*a*) John gave me a shilling yesterday.

(*b*) Teach erring man to spurn the rage of gain.

(*c*) 'With more than mortal powers endowed,
How high they soared above the crowd!'

ANALYSIS.

SENTENCES	SUBJECT	PREDICATE	OBJECT	EXTENSIONS
(*a*)	John	gave	a shilling (*dir.*) me (*indir.*)	yesterday (time)
(*b*)	(you)	teach	erring man (*indir.*) to spurn the rage of gain (*completion*)	
(*c*)	they endowed with .....powers	soared		how high above the crowd (degree).

SECOND PAPER.

(*One hour and a half allowed for this paper.*)

Geography.

1. Name in order the bays, river mouths, and firths along the east coast of England and Scotland.

Beginning on the north and going south we have Pentland Firth, Dornoch Firth, Cromarty Firth, Beauly Firth, Moray Firth, F. of Tay, St. Andrew's Bay, F. of Forth, Mouth of the Tweed, Mouth of Tyne, Mouth of Tees, Humber, Wash, Yarmouth Roads, Estuary of the Thames, and the Downs.

2. Where and for what noted are Belfast, Kilkenny, Limerick, Langholm, Wakefield, Bath, Huddersfield, St. Kilda?

Belfast, on Belfast Lough, in co. Down, is the second city in Ireland for population, and greatly exceeds Dublin in manufacturing industry, especially for linen and cotton. It has considerable foreign and cross-channel trade, and is the seat of one of the 'Queen's Colleges.'

Kilkenny, on the river Nore, is the second city in the province of Leinster. The streets are paved with black marble, quarried in the vicinity. Swift, Congreve, and Berkeley received the early part of their education in the grammar school here.

Limerick is a large and populous city on the Shannon at the head of the estuary; is a place of great antiquity, and the fourth largest city in Ireland. At the Revolution it was a stronghold of the cause of James II., but capitulated to the troops of William in 1691. It has great import and export trade, and manufactures beautiful lace.

Langholm, a town in Dumfriesshire, on the Esk, is near the English border, and noted for woollen manufactures. Telford, the famous engineer, was born here.

Wakefield, a town in the North Riding of Yorkshire, has various manufactures, iron works, and active trade in agricultural produce.

Bath is a handsome city in the county of Somerset, noted for its mineral waters, and it has long been the most fashionable watering-place in England.

Huddersfield, in the West Riding of Yorkshire, is an important seat of the woollen manufacture.

St. Kilda, an island in the Atlantic, 52 miles west of Harris, one of Hebrides, Scotland, is the resort of numerous sea-fowl, whose feathers are a source of income to the inhabitants.

History.

1. Mention any results arising from the friendly relations so long subsisting between Scotland and France.

The results arising from the friendly relations between the Scotch and the French were commonly disastrous to Scotland.

James, afterwards James I., being sent to France for safety from the intrigues of his uncle, was captured by the English, and was kept a prisoner for nineteen years.

In 1513 James IV. was induced to take part with France against Henry VIII., and he perished along with the greater part of his nobility in the fatal battle of Flodden.

During the minority of James V. the country was torn by English and French factions, and when he grew up and married Mary of Guise he became a persecutor of the leading reformers.

His daughter Mary after the battle of Pinkie (which was fought to compel her marriage with Prince Edward of England) was sent in her sixth year to France where she remained for thirteen years, imbibing those principles which led to her dethronement.

2. Describe briefly, and give the dates of the following battles:—Dupplin Moor, Sauchieburn, Pinkie.

Dupplin Moor, in Perthshire, was the scene of a battle between Baliol and the Earl of Mar, 1332. The Earl seeing the contemptible appearance of Baliol's English forces laughed at the idea of any danger from such a mere handful of enemies. Total carelessness was the natural consequence, but ere the dawn of day the English crossed the Earn and easily routed an army that had abandoned itself to intemperance.

At Sauchieburn, in Stirling, a battle was fought between James III. and his insurgent nobles, 1488. The malcontent army was 18,000 strong, and placed in three divisions. The Royal army was also in three parts. At first the rebels were driven back, but the second division stood firm, and the Royalists were made to retreat. James soon lost the little courage he possessed, and fled. In entering the village of Milton the king's horse was frightened by a woman and threw the king. He was carried to a miller's house and the inmates called for a priest. A man who pretended to be a priest came in, and, leaning over him, stabbed the king to the heart. The king's troops fought bravely for a time, but they heard a flying rumour of his death, and at last broke and fled.

The battle of Pinkie arose out of an invasion of Scotland by Protector Somerset in 1547. News having arrived that an English army had gathered for invasion, a Scottish army took up a strong position at Pinkie, near Musselburgh. Somerset drew up his troops and awaited an attack, the Scottish position being too strong to assail. The Scots left the hills and advanced to fight the English on the plain. After four hours hard fighting the van of the Scots was driven back a little. Mistaking this for flight some Highlanders flung down their arms and fled. The panic infected the rest and the whole army took to flight. The English followed and killed immense numbers of the fugitives.

3. Name the leaders of the Scottish Reformation and give a brief account of one of them.

The Leaders of the Scottish Reformation were George Wishart, John Knox, Andrew Melville, and the Earl of Murray.

John Knox was born at Haddington and was educated there and at St. Andrews for the priesthood. The reformed doctrines had already taken root in the minds of the people, but fear of the priests prevented the profession of them. Knox having embraced them was immediately an object of persecution. On the surrender of the castle of St. Andrews to the French, Knox who had joined the party in it was carried a prisoner to France and was made a galley slave. On his liberation he went to England and was favourably received by Cranmer, but he retired to Geneva when Mary I. became queen. After a time of unsettled wanderings he returned to Scotland in the heat of the conflict between Catholicism and Protestantism. His zeal hastened the work of destruction and arms were resorted to on both sides. Knox during these uncertain times never abated his preaching even at the peril of his life, as when his enemies placed soldiers to fire at him if he dared to speak after the taking of Edinburgh by the Lords of the Congregation. When Mary became Queen of Scotland Knox, who had spoken publicly against her, was an object of interest, and she sought to win him, but in vain. She then attempted to silence him by law, but the judges acquitted him of her charge and he continued his work. After a series of vexatious attempts to hinder him, all unsuccessful, he laid the foundation for the legal recognition of Presbyterianism in the very souls of the Scots. He died 1572.

END OF FIRST YEAR.

FIRST PAPER.

(Two hours and a half allowed for this Paper.)

Dictation.

Write from dictation, in a neat hand with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting the word 'Exquisitely.'

Write in small hand as a specimen of copy-setting, the sentence 'In a turret chamber high of ancient Holyrood.'

Arithmetic.

MALES.

1. Divide $\dfrac{1\frac{1}{15} \text{ of } 2\frac{5}{8}}{5\frac{1}{5} - 4\frac{1}{2}}$ by $\dfrac{2\frac{1}{2} + 1\frac{2}{3}}{81\frac{2}{3} - 62\frac{1}{2}}$

$$\frac{1\frac{1}{15} \text{ of } 2\frac{5}{8}}{5\frac{1}{5} - 4\frac{1}{2}} \div \frac{2\frac{1}{2} + 1\frac{2}{3}}{81\frac{2}{3} - 62\frac{1}{2}} =$$

$$\frac{\frac{16}{15} \times \frac{21}{8}}{5\frac{2}{10} - 4\frac{5}{10}} \div \frac{2\frac{3}{6} + 1\frac{4}{6}}{81\frac{4}{6} - 62\frac{3}{6}} =$$

$$\frac{\frac{16}{15} \times \frac{21}{8}}{\frac{7}{10}} \div \frac{4\frac{1}{6}}{19\frac{1}{6}} =$$

$$\frac{16}{15} \times \frac{21}{8} \times \frac{10}{7} \times \frac{115}{6} \times \frac{6}{25} = \underline{18\tfrac{2}{15}}. \text{ Ans.}$$

2. Find the value of ·856 of 2 cwt. 26 lbs. — $3{\cdot}2\dot{2}\dot{7}$ of 2 qrs. 10 lbs.

		lbs.
·856 of 2 cwt. 26 lbs.	= 250 lbs. × ·856 =	214
$-3{\cdot}2\dot{2}\dot{7}$ of 2 qrs. 10 lbs.	= 66 lbs. × $3\frac{5}{22}$ =	213
		1 lb. Ans.

3. How long would a column of men, extending 3,420 feet in length, take to march through a street a mile long at the rate of 58 paces a minute, each pace being $2\frac{1}{2}$ feet?

(*a*) The total number of feet to be marched before they clear the village is 5,280 ft. + 3,420 ft. = 8,700 ft.

(*b*) They march $2\frac{1}{2}$ ft. × 58 or 145 ft. per min.

(*c*) 145 ft. : 8,700 ft. :: 1 min. : *x*.

$\dfrac{1 \text{ min.} \times 8{,}700}{145} = \underline{60 \text{ min.}}$ or $\underline{1 \text{ hr.}}$ to march through the village.

4. If 7 men mow 37 acres in 3 days, working 8 hours a day, how many men could mow a field twice the size in 7 days, working 4 hours longer each day?

$$\left.\begin{array}{l} 1 \text{ size} : 2 \text{ sizes} \\ 7 \text{ days} : 3 \text{ days} \\ 12 \text{ ho.} : 8 \text{ ho.} \end{array}\right\} :: 7 \text{ men} : x.$$

$$\frac{7 \text{ men} \times 2 \times 3 \times 8}{1 \times 7 \times 12} = \underline{4} \text{ men. Ans.}$$

FEMALES.

1. Find the value of 5 ac. 2 ro. 7 po. 88 yds. at £161 16s. 8d. per acre.

	£	s.	d.			
	161	16	8	=	cost of 1 acre.	
			5			
	809	3	4	=	,,	5 acres.
2 ro. = $\frac{1}{2}$ of 1 ac.	80	18	4	=	,,	2 ro.
5 po. = $\frac{1}{16}$ of 2 ro.	5	1	$1\frac{3}{4}$	=	,,	5 po.
2 po. = $\frac{1}{40}$ of 2 ro.	2	0	$5\frac{1}{2}$	=	,,	2 po.
88 yds. = $\frac{1}{55}$ of 1 ac.	2	18	$10\frac{2}{11}$	=	,,	88 yds.
	900	2	$1\frac{19}{44}$	=	,,	5 ac. 2 ro. 7 po. 88 yds.

2. If for £1 11s. 6d. I can have 10 cwt. 80 lbs. carried 36 miles, what weight can I have carried 24 miles for the same money?

24 miles : 36 miles :: 10 cwt. 80 lbs. : *x*.

$$\frac{10 \text{ cwt. } 80 \text{ lbs.} \times 36}{24} = \underline{16 \text{ cwt. } 8 \text{ lbs.}} \text{ Ans.}$$

3. A bankrupt whose debts amount to £4,200 6s. 8d. after dividing his property among his creditors leaves £2,625 4s. 2d. unpaid; how much did he pay in the £?

			£	s.	d.
(*a*)	Total debts	=	4,200	6	8
	Unpaid ,,	=	2,625	4	2
	Paid ,,	=	1,575	2	6

(*b*) £4,200 6s. 8d. : £1,575 2s. 6d. :: £1 : *x*.
or or
1,008,080d. : 378,030d.

$$\frac{£1 \times 378030}{1008080} = \frac{7560600\text{s.}}{1008080} = \underline{7\text{s. } 6\text{d.}} \text{ Ans.}$$

Grammar.

Soon after this, *as* they began to talk of family affairs, a little boy at the lower end of the table *told her that* he *was going* into large-hand on Tuesday.

1. Give a detailed analysis of the above passage.
2. Parse fully the words in italics.

Sentences	Kind	Connec.	Subject		Predicate		Object		Extensions
			Simple	Enlargt.	Verb	Complmt.	Simple	Enlargt.	
(1) Soon after this a little boy at the lower end of the table told her	Prin.		a boy	little at the lower end of the table	told		her (indirect) (3) (direct)		soon after this (time)
(2) as they began to talk of family affairs	Subord. adv. to (1)	as	they		began	to talk of family affairs			
(3) that he was going into large-hand on Tuesday	subord. noun to (1)	that	he		was going	into large-hand			on Tuesday (time)

Parsing.

Soon—adv. of time mod. 'after' or 'soon after' = one word.

after—prep. shewing relation between 'told' and 'this.'

this—demonstr. adj., pron., neut., sing., obj., gov. by 'after.'

as—subord. conj., introd. subord. adv. sent, of time, connect. (2) with (1).

told—irreg. trans. verb (*tell, told, told*), indic., past., 3rd pers., sing., agr. with subj. 'boy.'

her—3rd pers., pron, fem., sing., obj., gov. by (to).

that—subord. conj., introd. noun sent., connect. (3) and (1).

was—irreg. aux. verb (*am, was, been*), indic., past, forming with pres. part. 'going.'

was going—prog. form of irreg. intrans. verb (*go, went, gone*), indic., past., 3rd pers., sing., agr. with subj. 'he.'

3. 'A relative pronoun stands for a noun, with the power of a conjunction besides.' Explain this by means of an example.

In the sentence 'I found an old friend, whom I had not seen for some time,' 'whom' is the same as '*and him*' I had not seen.

SECOND PAPER.

(*Two hours allowed for this paper.*)

Geography.

1. Draw an outline map of France, indicating the capes, river-mouths, bays, and principal seaports.

2. Name in order the chief objects of interest that you would pass in a coasting voyage from Nice to Venice.

In coasting from Nice to Venice we pass '*Genoa* the Superb,' beautifully built on a semicircular bay, once the rival of Venice, and the birthplace of Columbus; *Carrara*, noted for marble quarries; *Pisa*, birthplace of Galileo, with famous leaning-tower; *Leghorn*, noted for straw hats and plait; *Civita Vecchia*, once chief port of the Papal States; *Naples*, noted for its beautiful bay in the neighbourhood of Vesuvius and the ancient cities of Herculaneum and Pompeii; *Messina*, with a fine harbour and with the dangerous rock Scylla and whirlpool Charybdis (so often mentioned by the ancients) on either side of the straits; *Reggio*, touched at by St. Paul in his voyage to Rome. Rounding Cape Spartivento we enter the Gulf of Taranto; double Cape di Leuca and pass *Brindisi*, an important railway terminus on the overland route; *Loretto*, with a shrine of the virgin; *Ancona*, an important entrepôt; *Ravenna*, with Dante's tomb; and reach *Venice*, the 'Queen of the Adriatic.' *This voyage is solely confined to the objects of interest passed on the left.*

3. Where and for what noted are Elba, Cronstadt, Navarino, Elsinore, Amiens, Lyons, Cadiz, and Barcelona.

Elba, an island between Corsica and Italy, is noted as being the residence of Napoleon I. on his abdication in 1814.

Cronstadt, situated on an island in the Gulf of Finland, guards the approaches to St. Petersburg; was unsuccessfully bombarded by Sir Charles Napier, 1854.

Navarino, on the South West of the Morea, is a seaport where the Turkish and Egyptian fleets were destroyed by the allied squadrons of Britain, France and Russia, 1827.

Elsinore, a fortress on the coast of Denmark, commanding the passage of the Sound. Here, ships passing through used to pay toll to the king of Denmark.

Amiens, near the Somme, in France, has considerable manufactures, with a noble cathedral. Here was signed the treaty of peace between Britain and France, 1802. Birth place of Peter the Hermit.

Lyons, on the Rhone, at the junction with the Saône, is the second city in France for population and commercial importance, and the first for manufacturing industry, especially silk.

Cadiz is a large fortified city on the Isle of Leon, the principal commercial city in Spain, and the centre of the trade in sherry wine.

Barcelona, the former capital of Catalonia and second city in Spain for population, is strongly fortified, and largely engaged in trade and manufactures, having been a place of great importance for ages.

History.

1. Name the four greatest British Generals, and give an account of one of them.

In my opinion the four greatest British Generals are Cromwell, Marlborough, Clive, and Wellington.

Robert Clive, the founder of the British Empire in India, was born in Shropshire, 1725. He began life as a clerk in the East India Company's service, but being disgusted with that occupation he entered the army and distinguished himself against the French. Having captured Arcot with 500 men he defended it with 300 against thirty times that number. The French being everywhere repulsed, the supremacy of the English in Bengal was secured. To avenge the barbarous treatment of the English in the Black Hole affair, he defeated the Nabob of Bengal at Plassy in 1757, and laid the foundation of our Empire in India. On his return to England in 1759 he was made a peer; but was charged by the House of Commons with having abused his power to enrich himself. Though acquitted honourably he felt so insulted that he committed suicide, 1774.

2. What were the 'Berlin Decrees,' the 'Declaration of Indulgence' and the 'Bill of Rights'? Give dates.

The issuing of the 'Berlin Decrees' in 1806 was a plan tried by Napoleon to ruin the British. By these Decrees he forbade all commerce between Britain and the Continent.

The 'Declaration of Indulgence' (1687-88) granted full toleration to Nonconformists to worship in their own way in houses or chapels. It also suspended the penal laws against Roman Catholics.

The Parliament of 1689 passed the 'Bill of Rights' which has been called the third Great Charter of English liberties. In thirteen clauses the freedom of British subjects was secured. The chief propositions are these:—the crown cannot levy taxes nor keep a standing army in times of peace; the members of Parliament are free to utter their thoughts, and a Parliament is to be convened every year; elections are to be free, trial by jury is to be inviolate, and the right of petitioning the sovereign is not to be interfered with.

Composition.

1. Write the substance of the passage read to you; or

2. Write a letter on 'Robinson Crusoe,' or on 'Holidays.'

Edinburgh, 25th Feb., 1888.

Sir,

'Robinson Crusoe,' written by Daniel Defoe, was published in the year 1715. The story is founded upon the interesting narrative published a few years previous to the appearance of De Foe's novel, and which gave the particulars of the sojourn of Alexander Selkirk on the desert island of Juan Fernandez.

The story is too long for condensing into one short letter, but the chief heads of the tale may be given as follows:— When Robinson was about twenty years of age he ran off to sea, was shipwrecked, and without returning to Hull his native place he re-embarked on a ship bound for a foreign port. Again shipwrecked he fell into the hands of a Moor who kept him a slave for some time; escaping he was picked up by a British ship by which he was carried to Jamaica. Here becoming a successful planter he joined with some others in fitting up and lading a large ship for trading purposes. Of this merchant-ship he was placed super-cargo on account of his intimate knowledge of the sea and the coast. This turns out to be the voyage on which he is wrecked off Juan Fernandez, and he is the only one saved. The story of his being cast ashore, and the shifts he made to make himself as comfortable a home as possible with the plunder from the wreck, are all quaintly told in the very involved sentences of his journal. He leads a rather monotonous life with his parrot, his dog, and his cats, until he sees a 'footprint' on the sand, which puts him seriously about. It turns out that the island is visited by cannibals who bring prisoners to feast upon. One of these prisoners escapes and he remains with Crusoe as his man 'Friday'—so named from the day on which he was captured. Crusoe, according to the novelist, remains twenty years on the lonely isle, and is at last rescued by a British ship. The latter part of the novel becomes rather uninteresting.

I am, Sir,
Your obedient servant,
JAMES HUME.

END OF SECOND YEAR.

FIRST PAPER.

(*Two hours and a half allowed for this paper.*)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word 'Exquisitely.'

Write in small hand, as a specimen of copy-setting, the sentence 'In a turret chamber high of ancient Holyrood.'

Arithmetic.

MALES.

1. What principal is required to produce £225 1s. 6d. simple interest in three years at 5 per cent.?

In 3 yrs. at 5 per cent. £100 gains £15 of interest

Hence £15 : £225 1s. 6d. :: £100 : Prin. required

$$\frac{£225\ 1s.\ 6d. \times 100}{15} = \underline{£1{,}500\ 10s.}\ \text{Ans.}$$

2. Find the compound interest on £250 for three years at 4½ per cent.

	£	
Interest = $\frac{4\frac{1}{2}}{100}$ of	250	Principal for 1st year
Prin. every year	11·25	Interest ,, ,, ,,
	261·25	Principal ,, 2nd ,,
	11·75625	Interest ,, ,, ,,
	273·00625	Principal ,, 3rd ,,
	12·28528125	Interest ,, ,, ,,
	285·29153125	Amount for 3 years
	250	Principal at first
	£35·29153125	Compound Interest
	20	
	5·83062500	
	12	
	9·9675	

Compound Interest = $\underline{£35\ 5s.\ 9\frac{387}{400}d.}$ Ans.

3. A merchant sells to a retailer at 60 per cent. profit, but the latter failing, he only receives 2s. 6d. in the £; find the merchant's gain or loss per cent.

(*a*) He sells to the retailer for £160 what cost £100.

(*b*) He receives 2s. 6d. in the £, or ⅛ of the £160.

(*c*) What was sold for £160 therefore realizes £20.

(*d*) What cost £100 realizes only £20 = a loss of 80 per cent.

FEMALES.

1. A garrison of 1800 men have provisions for 12 weeks; how will the provisions last if 600 more men are introduced, but the daily allowance per man be diminished by one third?

$$\left.\begin{matrix}2400\text{ men} : 1800\text{ men}\\ 2\text{ parts} : 3\text{ parts}\end{matrix}\right\} :: 12\text{ weeks} : x.$$

$$\frac{12\text{ wks.} \times 1800 \times 3}{2400 \times 2} = \underline{13\tfrac{1}{2}\text{ weeks.}}\ \text{Ans.}$$

2. Simplify $4 + \dfrac{1}{2 - \dfrac{3}{4 - \frac{5}{6}}} - \dfrac{10\frac{5}{9}}{2 + \dfrac{3}{4\frac{5}{6}}}$

$$4 + \frac{1}{2 - \dfrac{3}{4 - \frac{5}{6}}} - \frac{10\frac{5}{9}}{2 + \dfrac{3}{4\frac{5}{6}}} = 4\,\frac{1}{2 - \dfrac{3}{3\frac{1}{6}}} - \frac{\frac{95}{9}}{2\frac{18}{20}}$$

$$= 4\,\frac{1}{2 - \frac{18}{19}} - \frac{\frac{95}{9}}{\frac{76}{20}}$$

$$= 4\tfrac{19}{20} - 4\tfrac{1}{36}$$

$$= 4\tfrac{171}{180} - 4\tfrac{5}{180}$$

$$= \tfrac{166}{180} = \underline{\tfrac{83}{90}}.\ \text{Ans.}$$

3. If A can do a piece of work in 9 days, B in 12 days, and C in 16 days, in what time could they do it, working together?

A	in 1 day does	$\frac{1}{9}$	or	$\frac{16}{144}$	of the	whole.
B	,, ,,	$\frac{1}{12}$	,,	$\frac{12}{144}$	,,	,,
C	,, ,,	$\frac{1}{16}$	,,	$\frac{9}{144}$	,,	,,
A, B, & C	,, do			$\frac{37}{144}$	,,	,,

∴ A, B, and C together will do the whole in $\frac{144}{37}$ days or $\underline{3\frac{33}{37}\text{ days.}}$ Ans.

4. What time should 24 men take to finish a work of which 18 men have done one-half in 15 days?

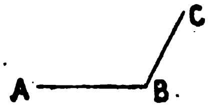
24 men : 18 men :: 15 days : x

$$\frac{15\text{ days} \times 18}{24} = \underline{11\tfrac{1}{4}\text{ days.}}\ \text{Ans.}$$

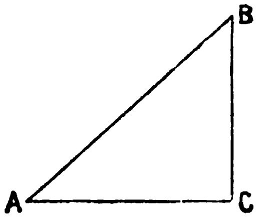
Euclid.

1. Define *obtuse angle, hypotenuse, polygon*, drawing a figure in illustration of each.

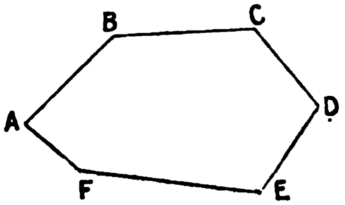
An *obtuse angle* is one greater than a *right angle* as ABC.



The *hypotenuse* is the side subtending the right angle of any right angled triangle; as AB in the right angled triangle ABC.



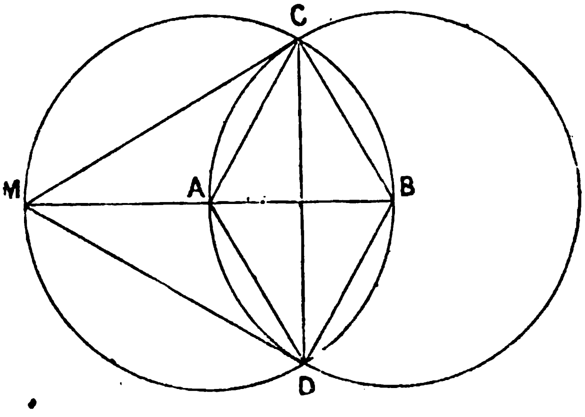
A *polygon* is a figure contained by more than four straight lines as ABCDEF.



2. If a straight line fall upon two parallel straight lines it makes the alternate angles equal; the exterior angle equal to the interior and opposite angles upon the same side; and the two interior angles on the same side together equal to two right angles.

Euclid, Book I., Prop. 29.

3. In the figure of Prop. I. let the given straight line AB be produced to meet one of the circles in M, and let C and D be the points of intersection of the circles: prove that the triangle CMD is equilateral.



Join DB, DA. Then the angles CBA, DBA being equal the angles CBM, DBM are also equal, and CB = DB and the side BM is common to the two triangles DBM, CBM ∴ (I. 4.) MC = MD.

Again, since the angle MAC, the exterior angle of the triangle ACB, is equal to the two interior opposite angles ABC, BCA, and that DAC is equal to the same two angles, being equal to two angles of an equilateral triangle. And since the two sides MA, AC are equal to the two sides DA, AC and the contained angle MAC = the contained angle DAC ∴ (I. 4.) the base MC = base DC, but MD = MC ∴ the three sides MA, MD, DC are equal and MDC is an equilateral triangle.

Q. E D.

Grammar.

'It is not easy to imagine *what* confusion this sight put me *into*, especially seeing them come on my side the *island* and so *near* me too; but when I observed their *coming* must be always with the current of the ebb, I began afterwards to be more *sedate* in my mind, being satisfied that I might go abroad with safety all the time of the flood if they were not on shore *before*.'

1. Give a general analysis of the above passage, showing the relation of the different clauses.
2. Parse fully the words in italics.

GENERAL ANALYSIS.

SENTENCES	KIND	CONNECT.	SUBJECT	PREDICATE
1. It is not easy to imagine	Principal		It	is not easy to imagine (2)
2. What confusion this put me into especially seeing them come on my side the island and so near me too	subord. noun to (1) obj. of 'imagine'		this	put me into what confusion..........too
3. but I began afterwards to be more sedate in my mind, being satisfied	Prin. in co-ord. with (1)	but	I	began afterwards ....satisfied
4. when I observed their coming must always be with the current of the ebb	subord. adv. to (3)	when	I	observed........ebb
5. that I might go abroad with safety all the time of the flood	Noun to (3)	that	I	might go........flood
6. If they were not on shore before	subord. adv. to (5)	it	they	were not........before

PARSING.

What—interrog. (indirect) adj. qual. 'confusion.'
into—prep. showing relation between 'put' and 'confusion.'
island—common noun, neut., sing., obj., gov. by (of).
near—adverb of place, mod. ('come') (some consider 'near' a prep.)
coming—gerund of (*come, came, come*) obj. gov. by 'observed.'
sedate—predic. adj. qual. I.
before—prep. used adverbially mod. 'were on shore.'

3. What is meant by the 'voice' of a verb? Distinguish between the passive voice and the progressive form, give examples.

Voice is that form which transitive verbs assume to show whether the subject of the sentence denotes the *doer* or the *object* of the action.

The form which is used in the former case is called the active voice, in the latter case the passive voice.

The *Passive Voice* is formed by adding the complete participle of a *transitive* verb to the verb 'to be' as, 'I am struck,' 'You were forced.'

The *Progressive Form* is made by adding the incomplete participle of *any* verb to the verb 'to be,' as, 'I am striking,' 'you are running.'

SECOND PAPER.

(*Two hours and a half allowed for this paper.*)

Geography.

1. Draw a map to show details of the Presidencies of Bengal and Madras.

2. What lands on or off the West coast of Africa belong to Britain; what are their characteristics, and how did they become British territory?

The British West African settlements now consist of Sierra Leone and the settlements on the Gambia. Sierra Leone (ceded to Britain 1787 by the native chiefs) consists of the peninsula of that name, Sherboro Island (acquired 1802) and some others. The settlement on the Gambia (founded 1588) consists of the Island of St. Mary, &c.

Gold Coast with Cape Coast Castle and the Island of Lagos are also British. Settlements were formed here by trading companies in 1672, who for a long period had rivals in the Dutch, but these transferred their claims to Britain 1872.

In these regions agriculture is generally neglected, but where pursued rice and ground nuts are the chief products. The principal exports are *palm oil* (especially from Lagos, the chief centre of trade), *gold* (especially from Cape Coast Castle), *ivory*, and *india rubber*. Coffee plantations have been tried in some places with success. For Europeans the coast, as everywhere else in tropical Africa, is very unhealthy. A very unhealthy region in Sierra Leone has been called 'the White Man's grave.'

3. Write short notes on each of the following:—Cape Town, Labrador, Jamaica, Niagara, and Cyprus.

Cape Town, under the shelter of a flat topped mountain called Table Mountain, is the capital of Cape Colony, and of the British Possessions in South Africa. It is strongly fortified and has a university. It was founded by the Dutch in 1652.

Labrador is a peninsula of British America between Hudson Bay and the Atlantic. It is cold and sterile, but Moravian missionaries have some settlements which are occupied by Esquimaux. It is a dependency of Newfoundland.

Jamaica, an island in the Caribbean Sea, is the most valuable of our West Indian Possessions. It was acquired by Britain 1655. The government is administered by a governor aided by a privy council and a legislative assembly. The principal exports are rum, sugar, coffee, spices, and fruits. Its capital is Kingston.

Niagara is a river which issues from lake Erie and falls into lake Ontario. Its cataracts are tremendous. The fall on the Canadian side is the great, or as it is called from its form the Horse Shoe Fall; here the stream, 2100 ft. broad is precipitated over a height of 150 ft. The other on the United States side is 1140 ft. wide and 162 ft. high. A suspension bridge has been erected over the river a little below the cataract.

Cyprus, an island at the eastern extremity of the Mediterranean sea, was transferred to Britain at the close of the Russo-Turkish war in 1878 for an annual contribution payable to Turkey. Its fruits, particularly grapes, preserve their ancient pre-eminence. The capital is Nicosia.

History.

1. Give an account of the Irish affairs in the time of Charles I. and Cromwell.

Early in his reign Charles I. made an arrangement with the Irish, granting certain concessions, which he afterwards repudiated. In 1631 Wentworth went over as Lord Deputy, and by his tyrannical government he roused the Irish into rebellion. A conspiracy was formed which soon spread through the country, and fearful scenes of blood-shed and cruelty resulted. The government of Strafford, which lasted for eight years, was not entirely evil, for he reformed the army, fostered trade, and encouraged manufactures. After his execution his army spread over the land, and a desperate massacre of Protestants was perpetrated in Ulster (1641), when many thousands were killed. Years of anarchy followed till Cromwell went over as Lord Deputy in 1649, and after the storming of Drogheda, Wexford, Kilkenny, Clonmel, and other towns, he left the conquered country under the command of Ireton and Ludlow. His treatment of the Irish at this time was so cruel that a native of the south of Ireland knows no heavier imprecation to this hour than *the curse of Cromwell on ye!*

2. Write short historical notes on each of the following :—The first Earl of Chatham, Sir Robert Walpole, Nelson, William Pitt.

The first Earl of Chatham was born 1608, educated at Eton and Oxford, a short time in the army, entered Parliament 1735, and rose by his great abilities and eloquence till he became secretary of state 1757. Directed the Government during the seven years, war. Created a peer 1766. Retired from the Government 1768. Opposed the taxation of the American Colonists. Died 1778.

Sir Robert Walpole became prominent by his impeachment of Bolingbroke 1715. Restored public credit after the bursting of the South Sea Bubble 1720, and became Prime Minister 1721. Continued at the head of affairs chiefly by means of bribery till 1742, when he lost his post. Was made Earl of Oxford the same year. Died 1745.

Nelson was born at Burnham Thorpe. Became midshipman when 12 years of age. Served in an Arctic expedition. Distinguished himself when Commodore at St Vincent 1797, and was made an admiral. Lost his eye at Corsica, and an arm at Teneriffe. Defeated the French at Aboukir Bay 1798. Bombarded Copenagen 1801. Crushed the naval power of France at Trafalgar 1805, but fell in the action.

William Pitt (the younger) was Prime Minister at twenty-five years of age 1783, and till 1806 with the exception of three years he was at the head of affairs. He had to cope with Napoleon's ambition, deal with the Irish Rebellion of 1798, and pass the Act of Union 1800. He died 1806, and was buried in Westminster Abbey.

Composition.

1 Write tull notes of a lesson to an advanced class on 'The Camel' or 'The Atmosphere.'

THE CAMEL.

(*Show picture of camel, camel hair pencil, and read or tell a story.*)

Classification.—Ruminant or cud-chewer, hoofed, mammal.

Home.—Arabia, Africa, Central Asia (for the Bactrian C.), S.E. of Europe.

General Characteristics of structure.—Head long; upper lips cleft and mobile (*to be explained*); eyes large, with a long lashed upper eyelid as a protection (*why?*); nostrils sit obliquely, and capable of being closed at will; ears small; neck elongated; back—Arabian C. with one hump, Bactrian C. with two humps; shortish tail; toes united by a callous pad below (*show advantage of this*); hair inclined to wooliy; pads on breast, and the joints of the limbs (*advantage of these*); general appearance gaunt and angular; limbs meagre and out of proportion to size of animal; ungainly and awkward walker or runner. Stomach very peculiar, capable of keeping a store of water, (*value of this*); hump consisting of fat nourishes the animal during a long fast (*compare with hibernating animals*).

Habits.—Lives on dry coarse shrubs and herbage, especially camel-thorn; feeds during the day; travels best at night; can walk five or six miles an hour; seldom walks faster than three or four; carries 700 to 1000 lbs; kneels down to take up, or discharge load; a very cross and cantankerous animal.

Uses.—'Ship of the desert' (*why?*); carries its master and goods; camel trains or caravans travelling (*describe*); sometimes saves life by being killed for the water in its stomach; milk and flesh used for food; skin made into water-bottles; its valuable hair made into cloth, shawls, rugs, small paint brushes, carpets, and many other things (*compare with horse, cow, and sheep, which are combined in this animal*); a body of camel artillery used by East India Company.

Kinds and where found.—Bactrian camel with two humps, in Central Asia and China; Arabian camel or dromedary with one hump found in Egypt, Arabia, Syria, North Africa, Persia, India, &c.

Allied species.—Llamas (guanaco, vicuña, yamma, and alpaca), ound in various parts of South America. (*These may be reserved for another lesson.*)

N.B.—Use B.B. freely, and show the evidences of design in the adaptation of the camel for travelling over arid deserts.

Latin.

FIRST STAGE.

(*The answers to be written on a separate paper*).

1. Give the gender and the genitive singular of each of the following nouns :—liber, sidus, gradus, res, collis, mons, bos, virtus.

NOUN	GENDER	GENITIVE
liber	mas.	libri
sidus	neut.	sideris
gradus	mas.	gradûs
res	fem.	rei
collis	mas.	collis
mons	mas.	montis
bos	mas. or fem.	bovis
virtus	fem.	virtutis

2. Decline *ego* and *sui* throughout; and write out the infinitive with the participles active and passive of *amo*, *doceo*, and *audio*.

	SING.	PLUR.	SING. AND PLUR.
N.	ego	nos	—
G.	mei	nostrum or nostri	sui
D.	mihi	nobis	sibi
A.	me	nos	se
V.	—	—	—
A.	me	nobis	se

ACTIVE.

Infinitive.

Pres.	amare	docere	audire
Perf.	amavisse	docuisse	audivisse
Fut.	amaturum (am, um) esse	docturum (am, um) esse	auditurum (am, um) esse

Participles.

Pres.	amans	docens	audiens
Fut.	amaturus, a, um	docturus, a, um	auditurus, a, um

PASSIVE.

Infinitive.

Pres.	amari	doceri	audiri
Perf.	amatum (am, um) esse	doctum (am, um) esse	auditum (am, um) esse
Fut.	amatum iri	doctum iri	auditum iri

Participles.

Perf.	amatus (a, um)	doctus (a, um)	auditus (a, um)
Gerundive	amandus (a, um)	docendus (a, um)	audiendus (a, um)

3. Translate into English and parse the words in italics :—

(*a*) Salus *reipublicæ* est suprema lex.
(*b*) Avis in *summa* arbore *cantabat.*

TRANSLATION.

(*a*) The safety of the state is the highest law.
(*b*) A bird used often to sing on the top of the tree.

PARSING.

Reipublicæ—subst., fem., 5th and 1st decl. (*respublica, reipublicæ*), gen., gov. by 'salus.'

Summa—adj., 1st and 2nd decl. (*summus, a, um*), abl. sing., fem., qual. 'arbore,' superl. deg., of *superus, superior, supremus*, or *summus.*

Cantabat—verb, intrans., frequentative, reg., 1st conj., indic., imperf., 3rd pers., sing., agr. with avis.

OPTIONAL.

Translate into Latin :—

(*a*) The girl was loved by the father.
(*b*) Ye have broken (violare) the laws of your country.

TRANSLATION.

(*a*) Puella a patre amata est.
(*b*) Patriæ leges violâstis.

END OF THIRD YEAR.

FIRST PAPER.

(Two hours and a half allowed for this Paper.)

Dictation.

Write from dictation in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word 'Exquisitely.'

Write in small hand, as a specimen of copy-setting, the sentence, 'In a turret chamber high of ancient Holyrood.'

Arithmetic.

MALES.

1. A grocer starts business with £2,000. Six months later he admits a partner with £3,000. What is each man's share of the year's profit of £850.

£2,000 × 1 = 2,000 for 1 year.
3,000 × $\frac{1}{2}$ = 1,500 ,, 1 ,,
Capital = 3,500 ,, 1 ,,
£ £ £
∴ 3,500 : 2,000 :: 850 : share of 1st.
$\frac{£850 \times 2000}{3500}$ = £485 14s. $7\frac{3}{7}$d. share of No. 1.
∴ £850 − £485 14s. $7\frac{3}{7}$d. = £364 5s. $4\frac{4}{7}$d. share of No. 2.

2. A person sells out of the Three per Cents. at 96, and invests his money in Railway Five per Cent. Stock at par; find how much per cent. his income is increased.

(*a*) Income from £96 in the Three per Cents. = £3
(*b*) Income from £96 in the Railway Stock at
5 per cent. = $\frac{£96 \times 5}{100}$ = £$4\frac{4}{5}$
Diff. between first and second income = £$1\frac{4}{5}$
∴ £3 : £$1\frac{4}{5}$ :: £100 : increase of income p.c.
$\frac{£100 \times 1\frac{4}{5}}{3} = \frac{900}{15}$ = 60 p.c. Ans.

FEMALES.

1. Write down a rule for the multiplication of decimals, and multiply ·000076 by ·0084.

Rule.—Multiply as in whole numbers, and mark off as many decimal places in the product as there are in both factors. Ciphers are prefixed to make up the proper number of figures in the decimal.

```
·000076
  ·0084
-------
    304
   608
-----------
·0000006384 Ans.
```

2. Simplify, $\frac{2·34 + 56·7}{4·8 \times 5·9}$

$\frac{2·34 + 56·7}{4·8 \times 5·9} = \frac{59·04}{28·32}$
$= 2\frac{20}{236}$. Ans.

3. If 6·5 lbs. of sugar cost 1·75 shillings, what will 3·02 cwt. cost?

6·5 lbs. : 3·02 cwts. :: 1·75s. : x
or 338·24 lbs.
$\frac{1·75\text{s.} \times 338·24}{6·5} = \frac{591·92}{6·5}$s.
= 91s. $0\frac{252}{325}$d.
= £4 11s. $0\frac{252}{325}$d. Ans.

4. Find the value of ·83̇ of 13s. 4d. + ·138̇ of £1 4s. and express the result as the decimal fraction of £5.

		s.	d.
(*a*)	·83̇ of 13s. 4d. = $\frac{5}{6}$ of 13s. 4d. =	11	$1\frac{1}{3}$
	·138̇ of £1 4s. = $\frac{5}{36}$ of £1 4s. =	3	4
	Total value =	14	$5\frac{1}{3}$

(*b*) 14s. $5\frac{1}{3}$d. to the dec. of £5 = $\frac{14\text{s. } 5\frac{1}{3}\text{d.}}{£5}$
$= \frac{173\frac{1}{3}\text{d.}}{1200}$
$= \frac{520}{3600}$
= ·14. Ans.

Euclid.

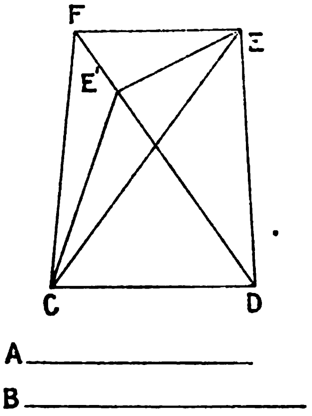
1. On a given straight line to describe a square.

Euclid Bk. I. Prop. 44.

2. In every triangle the square on the side subtending an acute angle is less than the squares on the sides containing that angle by twice the rectangle contained by either of these sides, and the straight line intercepted between the perpendicular, let fall on it from the opposite angle and the acute angle. [Confine proof to the case of an acute angled triangle.]

(Euclid Bk. II., Prop. 13.)

3. If two sides of a triangle be given, its area will be greatest when they contain a right angle.



Let A and B be the two given straight lines equal to the two sides of a triangle, the area will be greatest when A and B contain a right angle. Make CD equal to A and let DE be at right angles to CD and equal to B. Join CE. The triangle CDE will be greater in area than any other triangle having its two corresponding sides equal to A and B.

Through E draw EF parallel to CD. Draw any straight line DF. DF is greater than DE because DEF is a (I. 29) right angle and DFE is less than a right angle (I. 18). Cut off DE' equal to DE (A) and join E'C and FC. Then the triangle CFD is equal to the triangle DCE because they are on the same base DC and between the same parallels DC and FE. But the triangle CFD is greater than the triangle CE'D ∴ the triangle CED is greater than the triangle CE'D.

Q. E. D.

Algebra.

1. Find the least common multiple of $9x^2 - 4$, $6x^2 + 6 - 13x$, and $6x^2 + 5x - 6$.

Breaking up into Factors.

$$\begin{aligned} 9x^2 - 4 &= (3x - 2)(3x + 2) \\ 6x^2 + 6 - 13x &= (3x - 2)(2x - 3) \\ 6x^2 + 5x - 6 &= (3x - 2)(2x + 3) \\ \therefore \text{L.C.M.} &= (3x - 2)(3x + 2)(2x - 3)(2x + 3) \\ &= (9x^2 - 4)(4x^2 - 9) \\ &= 36x^4 - 97x^2 + 36. \text{ Ans.} \end{aligned}$$

2. Solve the following equations:

$$\tfrac{1}{6}(x + 3) - \tfrac{1}{7}(11 - x) = \tfrac{2}{5}(x - 4) - \tfrac{1}{21}(x - 3)$$

clearing of fractions L. C. M. = 210

$$\begin{aligned} 35x + 105 - 330 + 30x &= 84x - 336 - 10x + 30 \\ 35x + 30x - 84x + 10x &= 330 - 105 - 336 + 30 \\ -9x &= -81 \\ x &= 9. \text{ Ans.} \end{aligned}$$

3. B and C have the same income: B lays by a fifth of his; but C, by spending annually £80 more than B, at the end of four years finds himself £220 in debt. What was their income?

Let £x = income of each.
then £$\frac{4}{5}x$ + £80 = amount, B. spends annually.

$$\therefore 4\left(\frac{4x}{5} + 80\right) = 4x + 220$$
$$16x + 1600 = 20x + 1100$$
$$16x - 20x = 1100 - 1600$$
$$4x = 500$$
x = £125 income required. Ans.

Grammar.

'The Hebrews thus, *carrying* in joyful state
Thick boughs of palm and willows from the brook,
Marched round the altar—to *commemorate*
How, when their course they through the desert took,
Guided by signs which ne'er the *sky* forsook,
They lodged in leafy tents and cabins low.'

1. Analyse the above passage.
2. Parse fully the words in italics.

ANALYSIS.

SENTENCES	KIND	CONNECT.	SUBJECT	PREDICATE	OBJECT	EXTENSIONS
1. The Hebrews thus, carrying in joyful state thick boughs of palm and willows from the brook, marched round the altar—to commemorate	Prin.		The Hebrews thus .... the brook	marched		round the altar (place) to commemorate (purpose)
2. how they lodged in leafy tents and cabins low	Subord. noun to (1)	How	they	lodged		in leafy tents and cabins low (place)
3. when their course they through the desert took guided by signs	Subord. adv. to (2)	when	they guided by signs	took	their course	through the desert (place)
4. which ne'er the sky forsook	Subord. adj. to (3)	which	which	forsook	the sky	ne'er (time)

PARSING.

Carrying—incomplete or pres. part. of reg. verb 'to carry, qual. 'Hebrews.'

Marched—verb, reg., intrans., act., indic., past., 3rd pers., plur., agr. with subj. 'Hebrews.'

Commemorate—verb, reg., intrans., infin., pres. of verb 'to commemorate,' gov. by 'marched.'

How—adv. of manner mod. 'lodged.'

Sky—com. noun, neut., sing., obj., gov. by 'forsook.'

3. Illustrate the various uses of the following prefixes:—*ante*, *de*, *per*, *re*, *ex*.

Ante—before; as, *ante*diluvian, *anti*cipate, *ante*cedent.
De—down, from, off; as, *de*duce, *de*throne, *de*scend.
Per—through, thoroughly; as, *per*fect, *per*spire, *pel*lucid.
Re—back, again; as, *re*duce, *re*creation, *re*deem.
Ex—out of, out; as, *ex*press, *e*duce, *e*normous, *ef*fect.

SECOND PAPER.

(*Two hours and a half allowed for this paper.*)

Geography.

1. Draw an outline map of Africa, south of the Equator, and give one degree of latitude and longitude.

2. Describe, in words, the course of the Indus, and name its leading tributaries with the chief towns on their banks.

The Indus rises in Thibet near the source of the Brahmapootra. It first flows N.W. through lofty barren plains or deep mountain gorges; then breaking through the Himalayas it turns to the S.W. and is joined by the Cabool. Its course is now almost due south until it is joined by the stream formed by the united Sutlej, Beas, Ravee, Chenab and Jhelum. It now flows to the S.W. and at Hyderabad begins to form a delta, which occupies a space 130 miles in length and breadth. The total length of the river is about 1,650 miles.

The chief towns on their banks are Cabool Peshawur, Cashmere, Amritsur, Lahore, Mooltan, Aliwal, Hyderabad, Tatta, Kurachee.

2. Tell what you know about Delhi, the Brahmapootra, Herat, Smyrna, Aden, Hong Kong, Singapore, Mauritius, and St. Helena.

Delhi, long capital of the Mogul Empire, is situated on the banks of the Jumna. It is very strongly fortified, several of the gateways being magnificent. It is the seat of a college. In 1857 it was seized by the Sepoys, but retaken by the British in the same year.

The *Brahmapootra*, a large Indian river, whose source has not yet been reached by any European, is believed to rise in a lake in the plateau of Thibet, not far from the source of the Indus, flows through the valley of Assam and the province of Bengal, and, uniting with the Ganges, falls into the Bay of Bengal.

Herat is a commercial city of Afghanistan, in an extensive and fertile plan, near the Heri-rud; it is strongly fortified.

Smyrna is an ancient city and seaport of Asia Minor; a place of great trade, and claims to be the birthplace of Homer.

Aden is an almost impregnable town and fortress on the south-west coast of Arabia, belonging to Britain. Steamers to and from India, Australia, &c., call for coal and water. It has fine harbours.

Hong Kong is an island at the mouth of the Canton river in China, with a small tract on the mainland opposite. It is important as the centre of a great transit trade, and as a military and naval station.

Singapore, on a small island at the extremity of the Malay Peninsula, is a British seaport, lying on the route from and to Australia and Eastern Asia, and hence it is the most important seat of commerce in Indo-China.

Mauritius is an island in the Indian Ocean east of Madagascar. About two-thirds of the population are coolies, engaged on sugar plantations. The Seychelles Islands and Rodrigues are grouped with this island. Mauritius was taken from the French by the British in 1810.

St. Helena is an island in the South Atlantic, belonging to Britain. The port and capital is Jamestown, which is well protected. The island rises like a wall of rock, but the interior contains fertile, well-watered valleys. There is little industry beyond supplying the wants of passing ships. It is chiefly interesting as the prison of Napoleon I. from 1815 till his death in 1821.

History.

1. Give a brief account, with dates, of the Parliaments of Charles I.

1625. Charles' first parliament, granting him tonnage and poundage for one year only, was dissolved.

1626. His second parliament having impeached Buckingham was immediately dissolved.

1628. The third parliament drew up and obtained the king's assent to the famous 'Petition of Right.' Several members of this parliament were sent to prison, where one of them, Sir John Eliot, died.

From 1629 till 1640 there was no parliament, but in the latter year Charles was forced from want of supplies to summon his fourth parliament which met him with a request for a redress of grievances and was dismissed.

Then was summoned his fifth and last, called the 'Long Parliament.' This parliament executed Strafford, abolished the Courts of High Commission and Star Chamber, drew up remonstrances recounting the King's arbitrary acts, and finally made war against the king, 1642.

2. State what you know of the events that followed the Revolution of 1688.

On the final retirement of James a convention of the 'Three Estates of the Realm' met on January 22nd, 1689, and declared that James II. having violated the fundamental laws of, and withdrawn out of, the kingdom had abdicated the throne (the Scots went further and said he had forfeited it) and that the throne was vacant. A bill was then passed settling the throne on William and Mary; if they died without heirs the Princess Anne was to succeed. Before offering the crown to William and Mary their assent was required and given to a 'Declaration of Rights' as the undoubted rights and liberties of the English people. The chief points were afterwards embodied in the famous 'Bill of Rights.' On giving their assent to this declaration, William and Mary were declared on February 13th, 1689, to be King and Queen of England and Ireland. A convention of the Scottish peers and commons declared them King and Queen of Scotland three months later on, their assent being given to a 'Claim of Right' similar to the English 'Declaration,' but including the establishment of the Presbyterian form of church government.

Composition.

Write a letter describing the view from any hill in your neighbourhood, or on 'Autumn.'

Edinburgh, 25th Feb., 1888.

DEAR SIR,

I have much pleasure in giving a condensed description of the scene as viewed from Salisbury Craigs in the vicinity of this city.

After gaining the summit of this fine bold basaltic range we find that we could not have chosen a better spot for viewing the rising or setting of the sun. The prospect in its general outline commands a close-built high piled city, stretching itself out in a form which to a romantic imagination may be supposed to represent that of a dragon. Now is seen a noble arm of the sea, with its rocks, isles, distant shores and boundary of mountains, and now a fair and fertile country varied with hill, dale, and rock, and skirted by the picturesque ridge of the Pentland Hills. If we pursue the path which gently circles around the base of the cliffs the prospect changes at every step and presents the objects blended with, or divided from, each other in every possible variety to gratify the eye or the imagination. When a piece of scenery so beautiful, yet so varied, is lighted up by the tints of morning or of evening, and displays all that variety which gives character even to the tamest of landscapes, the effect approaches almost to enchantment. This path used to be my favourite evening and morning resort when engaged with a favourite author or new subject of study.

I am, dear Sir,

Your obedient servant,

WALTER SCOTT.

N.B.—*The above description is adapted from the 'Heart of Midlothian,' and is certainly a proper model.*

Latin.

SECOND PAPER.

(*Answers to be written on a separate paper*).

1. 'The sun is larger than the earth.' What are the two ways of translating this sentence into Latin?

1. Sol est major terrâ.
2. Sol est major quam terra.

2. What Latin prepositions govern two cases. Show by examples that the change of case involves a change of meaning.

The following prepositions govern two cases, viz, *in*, *sub*, *super*, *subter*, and *clam*.

In and *sub* with acc. imply motion to: Eo in urbem, I go *into* the town; sede in herbâ, I sit *on* the grass; sub mœnia tendit, he goes under the walls; sedet sub ponte, he sits under the bridge.

3. Give the principal parts of the following verbs:—*rapio*, *capio*, *quiesco*, *loquor*, *morior*; and give the third person plural of *nolo* through all its moods and tenses.

Present.	*Perfect.*	*Supine.*	*Infinitive.*
Rapio.	rapui.	raptum.	rapere.
capio.	cepi.	captum.	capere.
quiesco.	quievi.	quietum.	quiescere.

Pres.	*Perf. Part.*	*Infinitive.*
Loquor.	loquutus.	loqui.
morior.	mortuus.	mori.

NOLO.

	Pres.	*Imperf.*	*Fut.*
Indic.	Nolunt;	nolebant;	nolent;
Subj.	Nolint;	nollent;	——
Imper.	——	——	nolunto.
	Perf.	*Plup.*	*Fut. Perf.*
Indic.	noluerunt;	noluerant;	noluerint.
Subj.	noluerint;	noluissent;	——
Imper.	——	——	——

4. Translate, parsing the words in italics;—

(*a*) *Nescio* unde sol ignem *habeat.*
(*b*) Omnes *pauperum auxilio* egemus.

Translate into Latin:—

(*a*) Do not speak much: it is wiser to be silent.
(*b*) It is the duty of a citizen to obey the laws.

TRANSLATION.

(*a*) I do not know whence the sun has got his fire.
(*b*) We all need the help of the poor.

PARSING.

Nescio—1st pers., sing., pres., indic., act. verb, 4th conj. (*nescio, ivi,* or *ii, itum, ire*), agr. with subj. (ego).

habeat—3rd pers., sing., pres., subj., act. verb, 2nd conj. (*habeo, ui, itum, ere*), agr. with subj. 'sol.'

pauperum—gen., plur., mas. or fem., adj.. 3rd decl., *pauper, eris*, gov. by 'auxilio.'

auxilio—abl., sing., neut., noun, 2nd decl., auxilium, ii, gov. by 'egemus.'

TRANSLATION INTO LATIN.

(*a*) Ne multum loquere: sapientius est silere.
(*b*) Civis est legibus parere.

END OF FOURTH YEAR.

FIRST PAPER.

(*Two hours and a half allowed for this Paper.*)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write, in large hand, as a specimen of copy-setting, the word 'Exquisitely.'

Write, in small hand, as a specimen of copy-setting, the sentence, 'In a turret chamber high of ancient Holyrood.'

Arithmetic.

MALES.

1. The value of a ship is £25,000, and the insurance premium is 2 per cent.; for how much should she be insured so as to cover both value and premium?

£100 : £102 :: £25,000 : *x*

$$\frac{£25{,}000 \times 102}{100} = \underline{\underline{£25{,}500.}}\ \text{Ans.}$$

2. A clock which gains $1\frac{1}{2}$ minutes in 24 hours is 5 minutes slow at 10 o'clock on Monday morning; when will it show true time?

(*a*) $1\frac{1}{2}$ min. : 5 min. :: 24 hrs. : x

$$\frac{24 \text{ hrs.} \times 5}{1\frac{1}{2}} = \frac{240}{3} = 80 \text{ hrs. to make up 5 min.}$$

(*b*) 80 hrs. after 10 a.m. on Monday = $\frac{80}{24}$ = 3 days 8 hrs.
= 8 hrs. after 10 a.m. on Thursday, or *Thurs. at 6 p.m.*

FEMALES.

1. Find the true discount on a bill for £300, due three months hence at 4 per cent.

(*a*) Interest of £100 for 3 months at 4 per cent = £1.
(*b*) Amount of ditto ,, ,, = £101.
∴ £101 : £1 :: £300 : discount required.

$$\frac{£300 \times 1}{101} = \underline{£2\ 19\text{s.}\ 4\tfrac{88}{101}\text{d.}} \text{ Ans.}$$

2. In what time will £250 double itself at $2\frac{1}{2}$ per cent. simple interest?

$$\left.\begin{matrix} £2\frac{1}{2} \text{ int.} & : £250 \text{ int.} \\ £250 \text{ prin.} & : £100 \text{ prin.} \end{matrix}\right\} :: 1 \text{ yr.} : \text{time required.}$$

$$\frac{1 \text{ yr.} \times 250 \times 100}{2\frac{1}{2} \times 250} = \frac{100}{2\frac{1}{2}} = \underline{40 \text{ yrs.}} \text{ Ans.}$$

Note.—Any sum of money will double itself in the years denoted by 100 divided by the rate per cent.

3. Find the value of $\frac{2}{3}$ of $\frac{1}{2}$ of 6s. 8d. + ·375 of 9s. 2d. + $2\frac{1}{4}$ of 5s. 6d. − $\cdot 4\dot{2}$ of 7s. 6d.

$$\begin{array}{lrr} & \text{s.} & \text{d.} \\ \frac{2}{3} \text{ of } \frac{1}{2} \text{ of 6s. 8d.} = \frac{1}{3} \text{ of 6s. 8d.} = & 2 & 2\frac{2}{3} \\ \cdot 375 \text{ of 9s. 2d.} = \frac{3}{8} \text{ of 9s. 2d.} = & 3 & 5\frac{1}{4} \\ 2\frac{1}{4} \text{ of 5s. 6d.} = \qquad\qquad = & 12 & 4\frac{1}{2} \\ \hline & 18 & 1\frac{5}{6} \\ - \cdot 4\dot{2} \text{ of 7s. 6d.} = \frac{38}{90} \text{ of 7s. 6d.} = & 3 & 2 \\ \hline & 14 & 11\frac{5}{6}\text{d. Ans.} \end{array}$$

4. A person bought 374 eggs at 2 a penny, and some at 3 for twopence. He paid altogether £1 9s. 11d.; how many eggs did he buy at 3 for twopence?

	£	s.	d.
(*a*) Total money paid for eggs ...	1	9	11
374 eggs at 2 a penny cost ...	0	15	7
Money paid for eggs at 3 for 2d.	0	14	4

(*b*) 2d. : 14s. 4d. :: 3 eggs : x.
or
172d.

$$\frac{3 \text{ eggs} \times 172}{2} = \underline{258 \text{ eggs.}} \text{ Ans.}$$

Euclid.

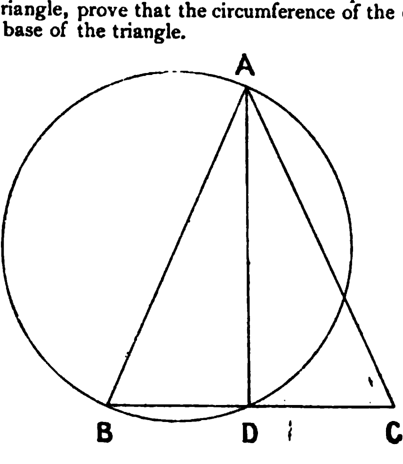
1. If a straight line be bisected and produced to any point, the rectangle contained by the whole line thus produced, and the part of it produced, together with the square on half the line bisected, is equal to the square on the straight line, which is made up of the half and the part produced.

Euclid, Bk. II., Prop. 6.

2. Equal straight lines in a circle are equally distant from the centre; and those which are equally distant from the centre are equal to one another.

Euclid, Bk. III., Prop. 14.

3. If the diameter of a circle be one of the equal sides of an isosceles triangle, prove that the circumference of the circle will bisect the base of the triangle.



Let the circumference of the circle ABD, whose diameter is AB, cut BC the base of the isosceles triangle ABC in D; then BC will be bisected in D. Join AD. Then because ADB is the angle in a semi-circle it is a right angle, and AD therefore cuts BC at right angles. Now the square on AB = the squares on AD, DB, and the square on AC = the squares on AD, DC. But the square on AB = the square on AC. Therefore the squares on AD, DB = the squares on AD, DC. Take away the common square on AD and the square on BD = the square on DC, or BD = DC. Hence BC is bisected in D.

Q.E.D.

Grammar.

1. Give the general analysis of the following lines:—

'*Needs* must I like it well; I weep for joy
To stand upon my kingdom once again.
Dear *earth* I do salute thee with my hand,
Though rebels wound thee with their horses' hoofs:
As a long-parted mother with her child
Plays fondly with her tears and smiles in *meeting*,
So, weeping, smiling, greet I thee, my earth,
And *do thee favour* with my royal hands.'

2. Parse fully the words in italics.

GENERAL ANALYSIS.

SENTENCES	KIND	CONNECTIVE	SUBJECT	PREDICATE
1. Needs must I like it well	Prin.		I	must needs like it well
2. I weep for joy to stand upon my kingdom once again	Prin.		I	weep for joy to stand upon my kingdom once again
3. dear earth I do salute thee with my hand	Prin.		I	do salute thee, dear earth, with my hand
4. though rebels wound thee with their horses' hoofs	subord. adv. of concession to (4)	though	rebels	wound thee with their horses' hoofs
5. As a long-parted mother with her child plays fondly with her tears and smiles in meeting	subord. adv. of manner to (6)	as	a long-parted mother with her tears and smiles in meeting	plays fondly with her child
6. So, weeping, smiling, greet I thee, my earth	Prin.		I weeping, smiling	greet thee so my earth
7. and I do thee favour with my royal hands	Prin. co-ord. with (6)	and	I	do favour (to) thee with my royal hands

PARSING.

Needs—adv. of necessity mod. 'must like.'
earth—com. noun, fem. (personification), nom. of address or vocative.
as—subord. conj., introd. subord. sent. of manner, cor. rel. with 'so.'

meeting—gerund of the intrans. verb (*meet, met, met*), obj., gov. by 'in.'

so—adv. of manner mod. 'greet.'

do—irreg. trans. verb (*do, did, done*), act., indic., pres., 1st pers., sing., agr. with 'I.'

thee—pron., 2nd personal, fem., sing., obj., gov. by (to) (thee is an indirect or dative object.)

favour—abstr. noun, neut., sing., obj., gov. by 'do.'

3. Estimate the effect of the Roman occupation of Britain upon the language of the people.

The natives in the main kept to their own language, but a certain number of Latin words were incorporated into the Welsh tongue, and we have the word 'street' from *strata* meaning "paved;' the termination —*coln* (colonia) as in Lincoln; and the terminations showing the existence of Roman camps, in which *castra* is variously corrupted into —*caster* as Lancaster, 'the fortress on the Lune,' —*chester* as in Manchester, —*cester* as Gloucester, and —*eter* as in Exeter (for Exe-cester) 'the fortress on the Exe,' and Uttoxeter.

Algebra.

1. Find the value of $(y^2 - z^2)[y^2 + z^2 - y(x - z)]$ if $x = \frac{1}{2}$, and $x + y = x + y + z = 0$.

(*a*) since $x + y = x + y + z$

$\therefore z = 0$

(*b*) since $x + y = 0$ and $x =. \frac{1}{2}$

$\therefore y = -\frac{1}{2}$.

$(y^2 - z^2)[y^2 + z^2 - y(x - z)] =$

$[(-\frac{1}{2})^2 - (0)^2][(-\frac{1}{2})^2 + (0)^2 - (\frac{1}{2} \times -\frac{1}{2}) - 0] =$

$\frac{1}{4}(\frac{1}{4} + \frac{1}{4}) = \underline{\frac{1}{8}}$. Ans.

2. Solve the equation $x^2 - \frac{7}{6}x - \frac{1}{2} = 0$

$x^2 - \frac{7}{6}x = \frac{1}{2}$

Completing square $x^2 - \frac{7}{6}x + \frac{49}{144} = \frac{1}{2} + \frac{49}{144} = \frac{121}{144}$

Extracting root $x - \frac{7}{12} = \pm\frac{11}{12}$

$x = \frac{7}{12} \pm \frac{11}{12} = \underline{1\frac{1}{2}}$ or $\underline{-\frac{1}{3}}$. Ans.

3. What number is that which is the same multiple of 7, that its excess above 20 is of its defect from 30.

Let x = the number.

Then $\frac{x}{7} = \frac{x - 20}{30 - x}$

$30x - x^2 = 7x - 140$

$x^2 - 23x = 140$

Completing sq. $x^2 - 23x + \frac{529}{4} = 140 + \frac{529}{4} = \frac{1089}{4}$

Taking root $x - \frac{23}{2} = \pm\frac{33}{2}$

$x = \frac{23}{2} + \frac{33}{2} = \underline{28}$. Ans.

SECOND PAPER.

(*Three hours allowed for this paper.*)

1. Draw a map of South America.

2. Write an account of the Indian Ocean, noting (*a*) its boundaries and extent, (*b*) its islands, (*c*) its prevailing winds, and (*d*) its currents.

The Indian Ocean is bounded on the north by Asia, on the west by Africa, and on the east by Malaysia and Australia. Its limits are partly natural and partly imaginary along the Antarctic Circle. South of Cape Agulhas the boundary between the Indian and Atlantic Oceans is an imaginary line going south to the Antarctic Circle. The boundary between this ocean and the Pacific is also theoretical.

Its area is variously estimated at from 17,000,000 to 25,000,000 square miles. It is shaped somewhat like an equilateral triangle, the average breadth being about 5000 miles. Of the islands actually within the Indian Ocean the principal are:—Madagascar, Bourbon, Mauritius, Rodrigues, Amirante, Seychelles, and Comoro; Zanzibar I. and Socotra; Chagos, Maldives, Laccadives; Ceylon, Andaman, Nicobar, and Mergui Is.; Sumatra, Java, Lombok, Sumbawa, Sandalwood, Flores, Timor; Melville I. and Tasmania; and the islets of St. Paul, Amsterdam, Kerguelen, Crozet, Marion, and Prince Edward in the open ocean on the south.

This Ocean is subject to severe periodical and variable winds. The periodical winds are known as the *monsoons* and blow from the N.E. for one-half of the year and from the S.W. during the other half. Of course these winds are affected in their direction by the contour and position of the regions over which they blow.

The waters of the Indian Ocean being very hot, several warm currents flow out of it in various directions. One of these originating in the Bay of Bengal passes through the Strait of Malacca, unites with other warm currents from the Java and Chinese seas, and flows out into the Pacific. Another from the Arabian and Red seas flows southwards between Africa and Madagascar till it meets the Cape Current from the Atlantic south of Cape Colony. The latter current, formerly supposed to be flowing northward, is now ascertained to be flowing southward till, after uniting with the Mozambique current, both find their way into the cold waters of the Antarctic Ocean.

3. Tell what you know about Philadelphia, Lima, Hawaii, Bolivia, Bermudas, Mount Erebus.

Philadelphia is the chief city of Pennsylvania, U.S., on the Delaware near its junction with the Schuylkill. It has a flourishing university, several literary and scientific institutions, extensive manufactures, and an important river and coasting trade.

Lima, the capital of Peru, is the handsomest city in S. America and the seat of the oldest university in the New World. The city suffers from earthquakes so often that its houses are generally of one story with flat roofs. Its port is Callao.

Hawaii, or Owhyee, the largest and most southerly of the Sandwich Islands, containing several lofty volcanic mountains, the principal of which is Mauna Loa, an active volcano. Gold has been found in the island.

Bolivia is a republic of South America, bordering on the Pacific Ocean. It is traversed by the Andes in the middle and western districts. Along the ocean there is a narrow desert, where rain is almost unknown. The mineral wealth of the country is great—the silver mines of Potosi being particularly famous. *Sucré* is the capital and the seat of the Government. Bolivia takes its name from Bolivar, the great champion of South American independence.

Bermudas is a group of islands in the Atlantic, east of South Carolina, surrounded by coral reefs. Long Island is the largest, and contains Hamilton, the seat of the Government. The other principal islands are St. George's, Ireland, and Somerset. A garrison of over 12,000 Imperial troops is stationed here.

Mount Erebus is an active volcano, nearly 13,000 feet in height, situated in Victoria Land (Antarctica). It was discovered and named by Sir James Ross on his voyage of discovery in 1842.

History.

1. What led to the War of the Spanish Succession, and why did Britain take part in it? Give a brief account of the war, with dates.

England with her allies, Germany, Holland, and afterwards Portugal and Savoy, made war against the combined forces of France and Spain. The main cause of the war was the setting of his grandson on the throne of Spain by Louis XIV., who was thus aiming at obtaining a preponderating influence in European affairs. England entered on the war partly for the foregoing reason and partly because Louis had recognised the son of James II. as lawful sovereign of England.

Marlborough was made Commander-in-Chief of the allied forces, and the war was carried on for nearly eleven years. By the victory of Blenheim, 1704, Germany was freed from the grasp of France, and compelled the Elector of Bavaria to sever his connection with Louis. Sir George Rooke in the same year captured Gibraltar, which has remained a British possession ever since. In 1706 Marlborough gained the great victory of Ramilies, and this battle was followed by the French leaving Flanders. The English were unsuccessful at Almanza, in Spain, and Prince Eugene was being foiled in Provence, but Marlborough atoned for these reverses by the overthrow of the French at Oudenarde, and by the capture of Lille. Louis at this juncture offered to treat for peace, but the negotiations fell through, and Marlborough and Eugene united, and the victory of Malplaquet was gained at a tremendous expense of blood (1709). In Spain Stanhope gained the victory of Saragossa (1710). Peace was not concluded till two years after, and only because France was entirely helpless.

2. Narrate the events which led to the Union of Great Britain and Ireland, with the date.

In no part of Europe was the evil example of the French Revolution followed so much as in Ireland. Encouraged by the success of the Americans, the 'Volunteers' banded themselves to secure reform in Parliament, but they were dispersed by the skilful tactics of the Government. In 1791 another society, called 'The United Irishmen,' was formed in Belfast for a similar purpose, but it was easily discovered that separation from Britain was meant. The French encouraged them and all seemed ready for an outbreak of rebellion, when the Government, acting on timely information, seized the chiefs, among whom was Lord Edward Fitzgerald. The worst effects of the rising were felt in the south; but General Lake routed the great mass of the rebels at Vinegar Hill, near Enniscorthy. The French sent some 900 troops, who landed at Killala Bay, in Mayo, but they had to surrender in a few weeks (1798).

This rebellion showed the necessity of a closer union with the Empire, and after many debates and much opposition, the union of the Parliaments was accomplished (1801).

Composition.

Write an essay on 'A comparison of the leading features of English, Scottish, and Irish character,' or on the question, 'How far, or in what way, should a teacher exercise supervision over pupils while in the playground?'

Leading Features of English, Scottish, and Irish character.

The most striking characteristics of an Englishman are his love of liberty, justice, and independence, and his liking for what he calls 'fair play' which is a synonym for honour and fair dealing. He claims as his birthright liberty of thinking, speaking, and writing as he pleases, so long as he does not overstep the bounds of truth. To foreigners he seems cold and reserved, but they respect him for his upright and manly conduct.

The Scotch are more reserved even than the English. They are, however, distinguished for their industry and perseverance. Their caution is proverbial, and though not readily associating with strangers they spare no pains or self denial to assist a fellow-countryman. They are attached to their church in a very marked degree, and for centuries have prided themselves on their schools and Universities. In no country is the Sabbath so strictly observed as a day of rest and religious observance.

The Irish being of Celtic origin are like all that race distinguished for a superficial brightness and intelligence. The brilliancy of their imagination and their inimitable humour are more striking than their depth of thought or power of patient and persevering research. The Irish are very warm hearted and hospitable, and a well educated Irishman is one of the most fascinating of companions. They are unfortunately inclined to be rash and improvident, and when very much excited regardless of human life.

Latin.

THIRD STAGE.

(*The answers to be written on a separate paper.*)

1. Translate into English :—

(*a*) Nam etsi sine ullo periculo legionis *delectæ* cum equitatu prœlium fore videbat, tamen committendum non putabat ut pulsis hostibus dici posset eos ab se per fidem in colloquio circumventos. Posteaquam in vulgus militum *elatum est*, qua arrogantia in colloquio Ariovistus usus omni Gallia Romanis interdixisset, multo major alacritas studiumque pugnandi majus exercitui injectum est.

(*b*) Boios petentibus *Æduis* quod *egregia* virtute erant cogniti, ut in finibus suis collocarent, concessit; quibus illi agros dederunt, quosque postea in parem juris libertatisque conditionem atque ipsi erant receperunt.

2. Parse fully the words in italics in the above passages.

TRANSLATION INTO ENGLISH.

(*a*) For although he saw that an engagement of a chosen legion with cavalry would be without any risk, nevertheless he did not think that he ought to act in such a manner that it could be said after the enemy was defeated that they had been drawn into a snare by him at a conference by means of plighted faith. After it was rumoured among the common soldiers what insolence Ariovistus had shown at the conference and had interdicted the Romans from all Gaul, much greater alacrity and greater eagerness for fighting was infused into our army.

(*b*) To the Ædui preferring the request that they might settle the Boii in their country, inasmuch as they were known to be of distinguished valour, he granted (their request); to whom they assigned lands, and whom afterwards they admitted to a like condition of (civil) right and liberty as they themselves were in (= enjoyed).

PARSING.

delectæ—gen. sing., fem., complete part. pass. verb of 3rd conj. (*delego, delexi, delectum, delegere*), agr. with 'legionis.'

elatum est—3rd pers. sing., perf., indic., pass., irr. verb, 3rd conj. (*efero, extuli, elatum, eferre*) used impersonally.

Æduis—dat. plur., prop. noun, 2nd decl. Ædui-orum, gov. by 'concessit.'

egregia—abl., sing., fem., agr. with 'virtute,' adj. 1st and 2nd decl. (egregius, -a, -um).

3. How is the reflexive pronoun *sui, sibi, se,* used in Latin composition? Give examples. 'Sui,' the reciprocal or reflexive pronoun, always refers to the subject, either of the verb by which it is affected, or to that of the principal and regulating verb of the sentence. Saul slew himself—Saulus se interfecit. Saul bade his armour-bearer slay him—Saulus armigerum suum se interficere jussit. Brutus brought money with him—Brutus pecuniam secum attulit.

4. Translate into Latin :—

(*a*) The calamities of others are not always (for) a grief to us.

(*b*) Let us not follow the advice of wicked men; let us obey the laws of our fathers.

(*c*) Cæsar was informed that the Germans had pitched their camp on the top of a hill.

TRANSLATION.

(*a*) Calamitates aliorum dolori nobis non semper sunt.

(*b*) Non sequamur consilium malorum; pareamus legibus patrium nostrorum.

(*c*) Cæsar certior factus est Germanos castra in summo colle posuisse.

——o——

Quarterly Arithmetical Tests.

STANDARD I.—FIRST QUARTER.

1. 314
60
507
82
9

2. 768
254

3. 940
610

4. 7 × 2;
6 × 3;
10 × 4.

SECOND QUARTER.

1. 5
67
890
53
4

2. 526
481

3. 273
69

4. 11 × 3;
4 × 5;
12 × 6.

THIRD QUARTER.

1. 29
706
8
93
451

2. 850
376

3. 111
82

4. 3 × 4;
8 × 5;
9 × 6.

STANDARD II.—FIRST QUARTER.

1. 407 + 9 + 28,016 + 5,930 + 64 + 7,002.
2. Take 49,807 from 50,012.
3. 74,892 × 28.
4. 6 × 9; 12 × 10; 8 × 12.

Second Quarter

1. 43,980 ÷ 5.

2. From 60,143 take 29,534. Write the answer in words.

3. Nine boys get 4 sums right, and seven boys get 3 right. How many were wrong out of 80?

4. 35d.; 58d.; 76d.

Third Quarter.

1. 75,804 × 7,900.

2. 67,490 ÷ 8.

3. A boy buys a shilling's worth of walnuts at 8 a penny, and gives 29 away. How many has he left?

4. 89d.; 102d.; 117d.

Standard III.—First Quarter.

1. Divide 64,804 by 34.

2. Find the product of nine thousand and sixty-eight and seven hundred and five, and prove your answer.

3. What is the quotient of nine hundred and sixty-three thousand and twenty and two hundred and sixty-nine?

4. Divide the difference between 760,089 and 810,003 by 58.

Second Quarter.

1. £29 14s. $6\frac{3}{4}$d. + 17s. $9\frac{1}{2}$d. + £5 12s. $8\frac{1}{4}$d. + $10\frac{1}{2}$d. + £60 19s. $0\frac{3}{4}$d. + £8 15s. $11\frac{1}{2}$d.

2. Take £38 17s. $4\frac{3}{4}$d. from £46 13s. $10\frac{1}{4}$d.

3. A mile is 1,760 yards. How many miles are there in 172,480 yards?

4. A farmer bought a horse for £27 18s. 6d. and a pony for £8 12s. 9d. He sold them both for forty guineas. How much did he gain?

Third Quarter.

1. From one thousand and sixteen pounds ten shillings and nine pence farthing take nine hundred and seven pounds eleven shillings and eleven pence halfpenny.

2. How many boxes, each holding a gross, can be filled from 97,700 lead pencils? How many more are required to fill another box?

3. Find the sum of five thousand and seven pounds eighteen shillings and four pence farthing, eighty-one pounds thirteen shillings and six pence halfpenny, seven hundred and twelve pounds eleven shillings and ten pence three farthings, nine thousand and fifty pounds fifteen shillings and eight pence, nineteen pounds sixteen shillings and eleven pence halfpenny, and eight hundred and forty-three pounds ten shillings and two pence three farthings.

4. How many pounds of sugar at $4\frac{1}{2}$d. per pound can be bought for half-a-guinea?

Standard IV.—First Quarter.

1. Multiply 17s. $9\frac{1}{4}$d. × 87.

2. If an acre of land be worth £129 13s. 4d., what is the value of 359 acres?

3. Divide ten thousand pounds and three-farthings by seven.

4. The cost of 79 dozen articles is £183 13s. 6d.; what is the value of each article?

Second Quarter.

1. Find the value of eighty-nine thousand and sixty marbles at twenty a penny.

2. Reduce 27 tons 15 cwt. 2 qrs. 1 st. to half-stones.

3. How many gallons, &c., are there in thirteen thousand and thirteen half-pints?

4. A man takes 8,910 steps, each 32 inches in length. How many miles has he walked?

Third Quarter.

1. If a man smoke $\frac{3}{4}$ oz. of tobacco in a day, how much will he spend in the month of April, if tobacco is 5d. per ounce?

2. Reduce 78 sq. yds. 5 ft. 108 in. to square inches.

3. How long would it take to count a million sovereigns, counting 125 each minute, and nine hours a day.

4. If the rim of a wheel be 15 feet round, how many times would it turn in going 14 miles?

Standard V.—First Quarter.

1. Find the cost of 57 tons of coals at $8\frac{3}{4}$d. per cwt.

2. What would be the cost of 2,093 articles at £7 3s. $5\frac{1}{2}$d. each?

3. Find the value of 26 gals. 2 qts. 1 pt. at 19s. 2d. per gallon.

4. What is the cost for 9 miles 1,210 yards at £13 17s. 4d. per mile?

Second Quarter.

1. If a railway train goes 584 miles in 16 hours, in what time will it make a journey of 365 miles?

2. If £22 8s. $5\frac{1}{2}$d. be paid for 2 cwt. 3 qrs. 21 lbs., what is that per quarter?

3. Bill:—1000 envelopes at 25 for 3d.; $7\frac{1}{2}$ dozen copy-books at 2d. each; 9 galls. of ink at $6\frac{1}{2}$d. per qt.; 34 books at 4s. 9d. per doz.; 15 dozen penholders at 2s. 3d. per gross.

4. A fishmonger bought a salmon for £1 2s. $4\frac{1}{2}$d., and by selling it at 1s. 3d. per lb. he gained 10s. 9d.; what was the weight of the salmon?

Third Quarter.

1. What must be added to $\frac{6}{7}$ to make $\frac{8}{9}$?

2. Subtract $\frac{1}{4} + \frac{1}{6} + \frac{1}{8}$ from 1.

3. A sixpenny loaf weighs $3\frac{3}{4}$ lbs. when flour is 1s. 8d. per stone; what will it weigh when flour is 1s. 3d. per stone?

4. Find the sum of $\frac{3}{4}$, $\frac{3}{5}$, $\frac{3}{7}$, $\frac{3}{8}$, and $\frac{3}{10}$.

Standard VI.—First Quarter.

1. Divide the sum of $\frac{3}{5}$ and $\frac{5}{8}$ by their difference, and add $\frac{7}{10}$ to the quotient.

2. Reduce $\frac{1}{32}$ and $\frac{1}{37}$ to decimals.

3. Simplify:—

$$\frac{\frac{5}{8}+\frac{4}{9}}{\frac{2}{3}-\frac{1}{6}} \div \frac{10}{21} \text{ of } 2\tfrac{4}{5}.$$

4. Divide 2·38 by ·007, and multiply the result by ·002.

SECOND QUARTER.

1. Reduce $\frac{7}{9}$ of a furlong to the decimal of a mile.

2. One pipe can fill a cistern in 3 hours, and another in 4 hours; in what time would they fill it running together?

3. What is the value of 3·027 of 4 guineas?

4. If 45 men can do a piece of work in 29 days, and if after they have been working 15 days, notice is sent to finish the work 4 days before the time agreed upon, how many additional men must be put on?

THIRD QUARTER.

1. Find the amount of £816 6s. 8d. for $4\frac{1}{2}$ years at $3\frac{3}{4}$ per cent.?

2. In what time will a sum of money double itself at $3\frac{1}{2}$ per cent.?

3. A man spent $\frac{1}{10}$ of his money, and then $\frac{1}{6}$ of the remainder, and had £33 15s. left. How much had he at first?

4. Find the simple interest on £4,365 12s. 6d. at $3\frac{2}{5}$ per cent. for $5\frac{1}{2}$ years.

STANDARD VII.—FIRST QUARTER.

1. If 24 men earn £350 in 5 weeks, in what time will 4 men earn 100 guineas?

2. What sum will amount to £776 14s. in $3\frac{1}{2}$ years at $2\frac{1}{4}$ per cent.?

3. If 35 houses, burning 4 fires each, consume 14 tons of coal in 16 days, how many houses, burning 5 fires each, will consume 27 tons in 12 days?

4. If £490 amount to £604 18s. in 6 years, what rate of interest is paid?

SECOND QUARTER.

1. What is the average of $2\cdot\dot{6}$, $1\frac{3}{5}$, ·75, $4\frac{1}{3}$, $3\cdot\dot{1}\dot{8}$, and $5\frac{1}{2}$?

2. A man got £136 interest on equal sums of money at $4\frac{1}{2}$ and $3\frac{1}{2}$ per cent. How much did he lend?

3. The average length of five streets is 387 yards; the first measures 194 yards, the second 235 yards, the third 406 yards, and the fourth 352 yards; find the length of the fifth street.

4. In what time will the interest on £572 10s. at $3\frac{1}{4}$ per cent. amount to £46 10s. $3\frac{3}{4}$d.

THIRD QUARTER.

1. A grocer bought tea at 20 guineas per cwt., and sold it at 3s. 8d. per lb.; what did he gain or lose per cent.?

2. A horse was sold for £32 4s. at a loss of 8 per cent.; find the prime cost.

3. A person owning 40 per cent. of a ship, sold 30 per cent. of his share for £840; what was the value of the ship?

4. If a fourpenny loaf weigh 2·75 lbs. when wheat is 6·3 shillings per bushel, what ought to be paid for 26·125 lbs. of bread when wheat is 7·25 shillings per bushel?

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	972.	1,019.	1,287.
2.	514.	45.	474.
3.	330.	204.	29.
4.	14; 18; 40.	33; 20; 72.	12; 40; 54.

STANDARD II.

	FIRST.	SECOND.
1.	41,428.	8,796.
2.	205.	30,609.
3.	2,096,976.	21 sums.
4.	54; 120; 96.	2s. 11d.; 4s. 10d.; 6s. 4d.

THIRD.

1.	59,851,600.	3.	67 walnuts.
2.	8,436 + 2.	4.	7s. 5d.; 8s. 6d.; 9s. 9d.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	1,906.	£106 0s. $11\frac{1}{4}$d.	£108 18s. $9\frac{3}{4}$d.
2.	6,392,940.	£7 16s. $5\frac{1}{2}$d.	678 boxes; 76 pencils.
3.	3,580.	98 miles.	£15,716 6s. $7\frac{3}{4}$d.
4.	860 + 34.	£5 8s. 9d.	28 lbs.

STANDARD IV.

	FIRST.	SECOND.
1.	£77 6s. $0\frac{3}{4}$d.	£18 11s. 1d.
2.	£46,550 6s. 8d.	8,890 half-stones.
3.	£1,428 11s. $5\frac{1}{4}$d.	813 gals. 1 qt. $\frac{1}{2}$ pt.
4.	3s. $10\frac{1}{2}$d.	$4\frac{1}{2}$ miles.

THIRD.

1.	9s. $4\frac{1}{2}$d.	3.	14 days 7 hrs. 20 min.
2.	101,916 sq. in.	4.	4,480 times.

STANDARD V.—FIRST.

1.	£41 11s. 3d.	3.	£25 10s. $3\frac{3}{4}$d.
2.	£15,012 18s. $3\frac{1}{2}$d.	4.	£134 6s. 8d.

SECOND.

1. 10 hours.
2. £1 18s. 2d.
3. £10s. + 15s. + 19s. 6d. + 13s. $5\frac{1}{2}$d. + 2s. $9\frac{3}{4}$d. = £3 0s. $9\frac{1}{4}$d.
4. $26\frac{1}{2}$ lbs.

THIRD.

1.	$\frac{2}{63}$.	3.	5 lbs.
2.	$\frac{11}{24}$.	4.	$2\frac{127}{280}$.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	$11\frac{3}{10}$.	$\cdot 097\dot{2}$.	£954 1s. $9\frac{1}{2}$d.
2.	·03125; $\cdot\dot{0}2\dot{7}$.	$1\frac{5}{7}$ hours.	$28\frac{4}{7}$ years.
3.	$2\frac{1}{48}$.	£12 14s. 4d.	£45.
4.	·68.	18 men.	£816 7s. $5\frac{1}{4}$d.

STANDARD VII.

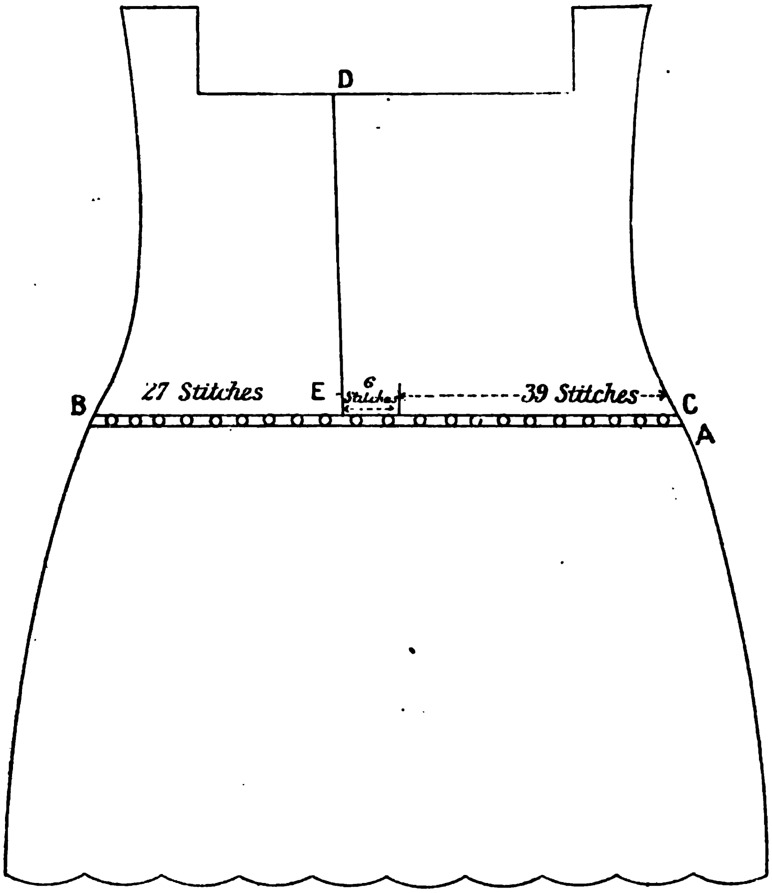
	FIRST.	SECOND.	THIRD.
1.	9 weeks.	$3\frac{7}{1320}$.	$2\frac{2}{3}$ per cent. loss.
2.	£720.	£3,400.	£35.
3.	72 houses.	748 yards.	£7,000.
4.	$3\frac{1}{2}$ per cent.	$2\frac{1}{4}$ years.	3s. $7\frac{1}{2}$d.

* * *

Knitting Maps.

BY MRS. J. D. HARRIS.

PETTICOAT FOR CHILD OF ONE YEAR.



Cast on 100 Stitches.

2 Bone pins. No. 10 Chamber's bell gauge.

4 oz. peacock wool.

The pattern for the skirt of this pretty petticoat, which has the effect of being pleated, is as follows:—

1st row.	*Knit 1.	Purl 9.	Repeat to end of row.
2nd row.	*Knit 8.	Purl 2.	Ditto.
3rd row.	*Knit 3.	Purl 7.	Ditto.
4th row.	*Knit 6.	Purl 4.	Ditto.
5th row.	*Knit 5.	Purl 5.	Ditto.
6th row.	*Knit 4.	Purl 6.	Ditto.
7th row.	*Knit 7.	Purl 3.	Ditto.
8th row.	*Knit 2.	Purl 8.	Ditto.
9th row.	*Knit 9.	Purl 1.	Ditto.
10th row.	Purl a row.		

Cast on 100 stitches.

Knit 8 inches, which will be 7 rows of pattern.

To Reduce for Bodice.

A. Knit 1. Knit 2 together to the end of the row. 66 stitches in all.

B Make a row of holes, by putting the wool forward, and knitting 2 together.
(The rest of the bodice is now knit 1, purl 1.)

To make the Opening at the Back.

C. Knit 39. Leave the other 27 stitches on the pin, and knit and purl the 39 backwards and forwards for 5½ inches.

D. Cast off all but 10. Knit these 1½ inches more for shoulder strap, and cast off.

For the other half of Back.

E. On the pin with the 27 stitches pick up 6 loops from the *back* of the side already knitted; fasten in the wool and then knit this side exactly like the other.

The other breadth of the petticoat is exactly the same, except that there is no opening in the bodice.

Sew up the side seams (leaving armholes) and the shoulder straps. Crochet a border round the skirt, neck and armholes, and run a ribbon in the waist and neck.

The Glass of Water; or, Cause and Effect.

(Comedy in Five Acts.)

LE VERRE D'EAU ; OU, LES EFFETS ET LES CAUSES.

(Comédie en Cinq Actes.)

PERSONS REPRESENTED.

La Reine Anne.	Queen Anne.
La Duchesse de Marlborough.	Duchess of Marlborough.
Henri de Saint-Jean.	Lord Bolingbroke.

Masham *(an Officer of the Royal Household).*
Abigail *(Cousin to the Duchess).*
Le Marquis de Torcy *(Louis XIV.'s envoy).*
Thompson *(Usher of the Queen's antechamber).*

Un membre de Parlement.	A Member of Parliament.

Acte Premier.	Act First.
Le théâtre représente un riche salon	The theatre represents a handsome saloon
du palais Saint-James.	in St. James's Palace.
Porte au fond.	Door in the background.
Deux portes latérales.	Two side doors.
A gauche du spectateur, une table	On the left of the spectator a table
et ce qu'il faut pour écrire ;	with writing materials ;
à droite, un guéridon.	on the right a round table (stand).

Scène I.	Scene I.
Le Marquis de Torcy, Bolingbroke, entrant par la gauche du spectateur ;	Enter the Marquis of Torcy, and Bolingbroke on the left ;
Masham, dormant sur un fauteuil,	Masham, asleep in an armchair,
près de la porte à droite.	near the door on the right.

Bolingbroke.

Oui, monsieur le marquis, cette lettre	Yes, Marquis, this letter
parviendra à la reine,	shall reach the queen,
j'en trouverai les moyens,	I will find means to do it,
je vous le jure,	I promise you faithfully,
et elle sera reçue avec les égards dus	and it shall be received with all the respect due
à l'envoyé d'un grand roi.	to the envoy of a great king.

De Torcy.

J'y compte, monsieur de Saint-Jean.	I rely on you, Monsieur de St. Jean.
Je confie mon honneur et celui de la France	I entrust my honour and the honour of France
à votre loyauté, à votre amitié.	to your loyalty and friendship.

Bolingbroke.

Vous avez raison...Ils vous diront tous	You do well...The world will tell you
que Henri de Saint-Jean est un libertin	that Henri de St. Jean is a libertine
et un dissipateur ; esprit brouillon	and a spendthrift ; fickle
et capricieux, écrivain passionné, orateur turbulent...	and of a meddling disposition, an irascible writer, a violent speaker...
je le veux bien...	I have no objection...
mais aucun d'eux ne vous dira	but not one of them will tell you
que Henri de Saint-Jean	that Henri de St. Jean
ait jamais vendu sa plume,	has ever sold his pen,
ou trahi un ami.	or betrayed a friend.

De Torcy.

Je le sais, et je mets en vous mon seul espoir.	I know it well, and I put all my hopes in you.
[*Il sort.*	[*Exit*

Scène II.	Scene II.
Bolingbroke, Masham.	Bolingbroke, Masham.

Bolingbroke.

O chances de la guere	What strange chances of war
et destinée des rois conquérants !	and fate of victorious monarchs !
l'ambassadeur de Louis XIV.	The ambassador of Louis XIV.
ne pouvoir obtenir dans le palais	cannot obtain in St. James's Palace
Saint-James une audience de la Reine Anne !...	an audience of Queen Anne !...
et, pour lui faire parvenir une note diplomatique	and in order that the note of a diplomatist may reach her
employer autant d'adresse	(to be compelled) to exercise as much tact
et de mystère que	and secresy as
s'il s'agissait d'une galante missive...	if it were a *billet doux...*
Pauvre marquis de Torcy...	Poor Marquis de Torcy...
si sa négociation ne réussit pas...	if his negotiations do not succeed...
il en mourra !...	it will break his heart !...
tant il aime son vieux souverain...	so much does he love his aged sovereign...
qui se flatte encore	who still dreams (flatters himself)
d'une paix honorable et glorieuse...	of an honourable and glorious peace...
La vieillesse est l'âge des mécomptes...	Old age is the age of disappointment (hope deceived).

Masham.

[*dormant.*	[*in his sleep*
Ah ! qu'elle est belle !	Oh ! how beautiful she is !

Bolingbroke.

Et la jeunesse...l'âge des illusions...	Oh youth !...the age of illusions...
Voilà un jeune officier	Look at this young officer
à qui le bien vient en dormant !	to whom happiness comes even when asleep.

Masham.

[*de même.*	[*asleep.*
Oui, je t'aime...	Yes, I love thee...
je t'aimerai toujours	I shall always love thee !

Bolingbroke.

Il rêve, le pauvre ieune homme !	He is dreaming, poor young man !
Eh ! mais c'est le petit Masham,	What ! I declare it is little Masham.
et je me trouve ici	Here I meet with
en pays de connaissance !...	an old acquaintance.

Masham.

[*dormant toujours.*	[*still asleep.*
Quel bonheur !...	What happiness !...
quelle brillante fortune !...	what a brilliant future !...
c'est trop pour moi !...	I am not worthy of it !...

Bolingbroke.

[*lui frappant sur l'épaule.*	[*striking Masham's shoulder.*
En ce cas, mon cher, partageons !	In that case, my dear fellow, we will go shares !

Masham.

[*se levant et se frottant les yeux.*	[*rising and rubbing his eyes.*
Hein !...qu'est-ce que c'est...	Ah !...What's the matter...
monsieur de Saint-Jean qui m'éveille !	Is it you Monsieur de St. Jean who wakes me?

Bolingbroke.

[*riant.*	[*laughing.*
Et qui vous ruine !...	And who ruins you !...

Masham.

Vous, à qui je dois tout !...	You, to whom I owe everything !...
Pauvre écolier, pauvre gentilhomme de province,	I a poor scholar, a poor provincial nobleman,
perdu dans la ville de Londres,	lost in the City of London,
je voulais, il y a deux ans,	I wanted, two years ago,
me jeter dans la Tamise,	to throw myself into the Thames
faute de vingt-cinq guinées,	for want of 25 guineas,
et vous m'en avez donné deux cents	and you gave me 200
que je vous dois toujours !...	which I still owe you !...

Bolingbroke.

Pardieu, mon cher,	Zounds ! my dear fellow,
je voudrais bien être à votre place,	I should like to be in your shoes ;
et je changerais volontiers avec vous...	I will willingly change places with you...

Masham.

Pourquoi cela?	Why so?

Bolingbroke.

Parce que j'en dois cent fois davantage.	Because I owe a hundred times more than that.

Masham.

O ciel ! vous êtes malheureux !	Oh heavens ! how unfortunate you are !

Bolingbroke.

Non pas ! ... je suis ruiné, voilà tout !...	Not at all !...I am ruined, that's all !...
mais jamais je n'ai été plus dispos,	But I was never more hearty,
plus joyeux et plus libre...	merry and free...
Pendant cinq années les plus longues de ma vie,	For five long years — the longest of my life,
riche et ennuyé de plaisirs,	I was rich and satiated with pleasures,
j'ai mangé mon patrimoine...	and I dissipated my property.
Il fallait bien s'occuper.	One must have something to do.
A vingt-six ans...tout était fini !...	At six and twenty all was gone !...

Masham.

Est-il possible?	Is it possible?

Bolingbroke.

Je n'ai pas pu aller plus vite !...	I could not go faster !...
Pour rétablir mes affaires,	To set me on my legs again,
on m'avait marié à une femme charmante...	they married me to a charming woman...
impossible de vivre avec elle...	with whom it was impossible to live...
un million de dot...	with a fortune of a million...
autant de défauts et de caprices...	and with as many defects and caprices...
J'ai rendu la dot...	I returned the fortune...
j'y gagne encore !...	and I still get the best of the bargain.
Ma femme brillait à la cour,	My wife shone at the court,
elle était du parti des Marlborough,	she belonged to Marlborough's party,
elle était whig ..	she was a Whig...
vous comprenez que je devais être tory ;	you know that I could not help being a Tory ;
je me suis jeté dans l'opposition :	I threw myself into the Opposition :
je lui dois cela !	I owe that to her !
je lui dois mon bonheur !	I owe her my happiness !
car, depuis ce jour,	for, from that day,
mon instinct et ma vocation	my instinct and my vocation
se sont révélés !	were revealed to me !
c'etait là l'aliment qu'il fallait	that was the stimulus
à mon âme ardente et inactive !	that my fiery but inactive soul needed !
Dans nos tourmentes politiques,	Amid the strife of parties,
dans nos orages de tribune,	in the storm of debate,
je respire, je suis à l'aise,	I breathe freely, I feel at my ease,
et comme le matelot anglaise	and like the English sailor
sur la mer, je suis chez moi,	on the ocean, I feel quite at home,
dans mon élément, dans mon empire...	in my element, in my kingdom...
Le bonheur, c'est le mouvement !...	Happiness (for me) consists in motion !
le malheur, c'est le repos !...	Unhappiness is rest !...
Vingt fois, dans ma jeunesse inoccupée,	Twenty times, in my vacant youth,
et surtout, dans mon ménage,	and especially, during my married life,
j'avais eu comme vous l'idée de me tuer.	I had thought of committing suicide.

Masham.

Est-il possible?	Is it possible?

Bolingbroke.

Oui...les jours où il fallait	Yes...on those days when I had
conduire ma femme au bal !...	to escort my wife to balls !...
Mais maintenant je tiens à rester !	But now I particularly wish to live on !
je serais désolé de partir !...	I should be extremely sorry to die !...
je n'en ai pas le temps...	I have no time to do so...
je n'ai pas un moment à moi...	I have not a moment for myself...
membre de la chambre des communes	A member of the House of Commons
et grand seigneur journaliste..	and a titled journalist...
je parle le matin, et j'écris le soir...	in the morning I speak and in the evening I write.
En vain le ministère whig	It is useless for the Whigs
nous accable de ses triomphes,	to try to crush us with their successes,
en vain il domine en ce moment	it is useless for them to rule at this moment
l'Angleterre et l'Europe...	England and Europe...
seul avec quelques amis,	Alone with a few friends,
je soutiens la lutte,	I keep up the struggle,
et les vaincus ont souvent troublé	and the conquered have often troubled
le sommeil des vainqueurs...	the sleep of the conquerors...
Lord Marlborough, à la tête de son armée,	Lord Marlborough, at the head of his army,
tremble devant un discours	trembles at a speech
de Henri de Saint-Jean,	of Henri St. Jean,
ou un article de notre journal *l'Examinateur.*	or an article in our newspaper *The Examiner.*

Il a pour lui le prince Eugène,	He has on his side Prince Eugene,
la Hollande et cinq cent mille hommes...	Holland, and 500,000 men.
J'ai pour moi Swift, Prior et Atterbury...	I have on my side Swift, Prior and Atterbury !...
A lui l'épée, à nous la presse !	He has the sword, we the press !
nous verrons un jour à qui la victoire...	we shall see one day who will gain the victory.
L'illustre et avare maréchal	The illustrious and avaricious marshal
veut la guerre qui épuise	loves war which empties
le trésor public et qui remplit le sien...	the public treasury but fills his own...
moi, je veux la paix et l'industrie,	I love peace and industry,
qui, mieux que les conquêtes,	which, far more surely than conquests,
doivent assurer la prospérité de l'Angleterre.	are calculated to secure the prosperity of England.
Voilà ce qu'il s'agit de	That is what we must
faire comprendre à la reine,	make the Queen understand,
au parlement et au pays.	as well as the Parliament and the country.

(To be continued.)

How my School was Examined.

BY THE

HEAD MISTRESS OF A LONDON SCHOOL.

STANDARD I.

Reading.—No questions were asked as to meaning of words.

Dictation.—The children were seated in the desks at reasonable distances, and all had to write the same words, as follows:—*large*, *small*, *white*, *rabbit*, *house*, *door*, *garden*, *leaves*, *open*, *dinner.*

Arithmetic.—The following set of sums was given to all the children:

(1)	(2)	(3)
70	587	706
582	498	690
97		
16		
105		

Answers.—(1) 870; (2) 89; (3) 16.

English.—There was no simultaneous repetition of the poetry. The Inspector selected about one-third of the girls to say it individually, and then asked several questions both on the meaning of single words, and on the sense of the passage.

Needlework.—The girls were equally divided and grouped according to the Needlework Schedule to work their specimens.

Mental Arithmetic.—Tables were not said, but such questions as the following were put by the Inspector. (1) If I get 2 ounces of tea for 2½d., how many do I get for 10d.? (2) If a boy spend ½d. per week, how long would he take to spend 6d.?

The non-examination children in this Standard had to read to the Inspector.

STANDARD II.

For the oral part of the examination the children were brought out in groups of about eight each, and for the written, were seated in the desks as in Standard I.

Reading.—After all the girls had read, the Inspector asked about ten questions on the meanings of words and the general sense of the passage.

Dictation.—This was given out by the Inspector, and all the girls had the same piece to write:

The woman in a moment saw her mistake, and called him back. But he did not hear her, or hearing her, he only quickened his steps. For he hurried down the street, and soon came to a fruit shop, where he caught sight of some fine cherries. John bought a few of them.

Arithmetic.—This also was dictated by the Inspector and was the same for the whole Standard:

(1) 30,096 − 1747.
(2) 789 × 96.
(3) 81,418 ÷ 8.
(4) 62,194 ÷ 9.

Answers:—(1) 28,349; (2) 75,744; (3) 10,177 + 2; (4) 6,910 + 4.

English Grammar.—The children had to pick out one word each from the reading book.

Poetry.—Three verses were repeated simultaneously, and then the Inspector heard about one-fourth of the girls say the passage individually. Questions on the meaning were asked by the teacher.

Needlework.—As in Standard I. the girls were divided into groups according to the Schedule to do their specimen work. *Garments* were shown by each girl in this and the preceding standard.

Mental Arithmetic.—The questions were given by the teacher.

Music had been taught to Standards I. and II. according to Division II. of the Code. The following exercises were given:—

Modulator:

d m s d' m r m d' s l t d' d r d

Time Test:

|l :l |— :l |— :— |l :l |l :— ||

The teacher had to question on this, and it was then sung to '*lah.*'

Song Test.—The Inspector heard one song which was chosen by the teacher.

Ear Tests.—Girls had to imitate the following phrases sung to 'lah' by the Inspector. d m r f,—s l s d,—m d r m,—d s m f.

Copy Books were shown by every child in Standards I. and II.

STANDARD III.

Reading.—Only two girls were asked questions on the meaning, and one question was put to the whole class.

Dictation.—'To maintain the king in proper state, great quantities of land were given him, and he had certain rights in the forests, woods, and mines, and when he travelled with his household he claimed food and shelter, free of expense, for himself and his servants, at the place where he stopped.'

Arithmetic.—Cards were given containing three mechanical sums each, and one problem. The mechanical sums were long division, or factor division by two figures, compound addition, and compound subtraction; and the following are specimens of the problems:—

A. A girl had 30s., and spent 9d. for railway fare, 14s. 3d. for a dress, 10s. 6d. for boots, and 2s. for other articles. What change had she to bring back?

B. A girl earned £30 per year. She gave her mother £2, and spent 9s. 6d. in dress, and 4s. 6d. for boots. How much had she left?

C. A man was 30 years of age when his son was born. His son died at the age of 50, ten years after his father. What age was his father when he died?

D. What is the difference between 56 threepences and 35 fourpences?

Answers.—*A.* 2s. 6d. *B.* £27 6s. *C.* 70 years. *D.* 2s. 4d.

English Grammar.—The tests in this subject were taken from the reading books. The five parts of speech required by the Code had to be selected, each girl taking one word.

Poetry.—The inspector heard two verses recited simultaneously, and then selected six girls to repeat individually. He next told the teacher to question, and then did so himself principally on the story of the poem.

Needlework.—The same remark applies to this as to the lower standards.

Mental Arithmetic.—The girls were allowed to put up their hands when they could answer; and such questions as the following were asked:—(1) How many days in a year? (2) How many in this year? (3) Where does the extra day come in? (4) If a man were born on Feb. 29th, how many birthdays would he have by the time he was 60? (5) How many half-crowns in £1? (6) How many 3d. books could I get for £1?

Garments and Copy Books were inspected in this and the higher standards after the girls had gone.

STANDARD IV.

Reading.—About one-fourth of the class were questioned on the meanings of words, and the general sense of the passage read.

Dictation.—'The heat which the sea receives from the sun it carefully stores away, and in due time dispenses for our good. Some of it is distributed by the currents of the sea, while part of it is given to the winds, furnishing them with the warm vapours which moderate the cold in winter and the heat in summer, in far distant regions. It is from the sea, moreover, that all the rivers of the earth are supplied.'

Arithmetic.—Specimens of cards used:—

A. (1) £9,113 13s. 3¼d. ÷ 13.

(2) £694 0s. 10¼d. × 87.

(3) Reduce 9,473 stones to tons.

(4) A clock was observed to gain half-a-minute between 9 and 12 o'clock. At that rate how much would it gain in a year?

B. (1) £309 10s. 10¾d. × 97.

(2) 3,979 6s. 0d. ÷ 52.

(3) Reduce 1 square pole to square inches.

(4) A draper's yard measure is half an inch short, and a lady buys 24 yards at 6d. per yard. What did the draper receive more than his due.

C. (1) 10s. 9½d. × 19.

(2) £360 0s. 9d. ÷ 23.

(3) How much is a ton of potatoes at 1d. per lb.

(4) If a lady distributed £39 17s. 6d. equally in three-penny pieces among 319 girls, how many did each get?

Answers:—*A.* (1) £701 1s. 0¼d. (2) £60,381 14s. 3¾d. (3) 59 tons 4 cwts. 14 lbs. (4) 1 day 20 minutes.

B. (1) £30,025 16s. 10¾d. (2) £76 10s. 6d. (3) 39,204 sq. in. (4) 2d.

C. (1) £10 5s. 0½d. (2) £15 13s. 0¾d. + 15 (3) £9 6s. 8d. (4) 10.

English Grammar.—The following sentence was written on the board, and individual children were required to parse each word fully:—*With one strong bound I burst my chain.* Questions were also asked on the definitions of the parts of speech and their inflections.

Poetry.—About half the girls were called upon individually to repeat portions of the passage, and they were questioned thoroughly on the plot and meaning of the poem.

Mental Arithmetic questions were asked by the teacher.

Music.—Standards III. and IV. were examined as Division III. according to the Code. A song chosen by the Inspector was sung; and the following tests were given.

Modulator:—

d t, l, d l d' ta l s fe s d

Time:—

|1 :1 |1.1:1 |1 : |1 :— |1 :1.1| :1 |1 :— |— :1 ||

A few questions were asked on the latter before it was sung.

Needlework was examined as in the lower standards.

STANDARD V.

Reading.—All three sets of reading books were used, and about six girls were questioned on the meanings of words and the sense of the passage read.

Writing.—Half the standard had to reproduce a short and suitable story read over to them as a test in composition, and the other half had to write a piece of dictation as follows:—

'The intrepid captain was calm and undismayed among the excited crowd. He prevailed on them to grant him three days more. If no land appeared within that time then the ships were to return home. Next day the sounding lead reached the ground, and a rush plant, a rose, and the branch of a thorn with red berries floated out to meet the ships. No sleep visited the eyes of Columbus that night. With unswerving gaze he looked towards the west, as the sun went down beneath the horizon. It was with difficulty he could conceal his delight.'

Arithmetic.—Specimens of cards:

A. (1) From $\frac{2}{3}$ + $\frac{1}{2}$ take $\frac{1}{4}$.

(2) 6 acres 2 roods 25 poles at £13 16s. 8d. per acre.

(3) 18 lbs. at $\frac{1}{2}$d. per lb., $5\frac{3}{4}$ lbs. at 1s. 2d. per lb., $7\frac{1}{4}$ lbs. at 6d. per lb., 5 doz. at 3d. each. Make a bill of these items.

(4) A woman bought three shillings' worth of eggs at 3 for 2d. What did she gain by selling them at 2 for $1\frac{1}{2}$d.?

B. (1) What must be added to $\frac{1}{9}$ to make $\frac{7}{10}$?

(2) 5 doz. articles at 3 for 2d., 5 lbs. at $8\frac{1}{2}$d. per lb., $3\frac{1}{4}$ lbs. at 10d. per lb., 17 lbs. at $3\frac{1}{2}$d. per lb. Make a bill of these items.

(3) Find the cost of 5 tons 5 cwt. 1 qr. 7 lbs. at £50 per ton.

(4) A woman bought 120 eggs at 15 for 1s. She broke 15 and sold the remainder at 5 for 6d. What did she gain?

C. (1) $\frac{1}{2}$ + $\frac{1}{4}$ + $\frac{1}{6}$ + $\frac{1}{8}$.

(2) 1,200 articles at £2 15s. $6\frac{1}{2}$d. each.

(3) If 35 men earn £77 in a certain time, how much will 63 earn?

(4) Make out a bill for—6 articles at 2 for $1\frac{1}{2}$d., 12 dozen at 1s. 4d. per dozen, 5 yds. at 2s. $1\frac{1}{2}$d. per yd., 4 yds. at $3\frac{1}{2}$d. per ft.

Answers.—*A.* (1) $\frac{11}{12}$. (2) £92 1s. $6\frac{3}{4}$d. (3) 9d. + 6s. $8\frac{1}{2}$d. + 3s. $7\frac{1}{2}$d. + 15s. = £1 6s. 1d. (4) $4\frac{1}{2}$d.

B. (1) $\frac{53}{90}$. (2) 3s. 4d. + 3s. $6\frac{1}{2}$d. + 2s. $8\frac{1}{2}$d. + 4s. $11\frac{1}{2}$d. = 14s. $6\frac{1}{2}$d. (3) £263 5s. $7\frac{1}{2}$d. (4) 2s. 6d.

C. (1) $1\frac{1}{24}$. (2) £1,332 10s. (3) £138 12s. (4) $4\frac{1}{2}$d. + 16s. + 10s. $7\frac{1}{2}$d. + 3s. 6d. = £1 10s. 6d.

English Grammar.—The sentences, which were rather long, were taken from the Historical Reader. They had to be analysed as well as parsed, and several questions were asked on the definitions.

Poetry.—About twelve girls were selected by the inspector to repeat the passage, and then questions were asked on the plot and meaning.

Mental Arithmetic was given by the teacher.

Needlework was examined as in other standards, all the specimens required by the schedule being given to different groups.

STANDARDS VI. and VII.

These two standards formed one class for examination, and had similar tests except in arithmetic.

Reading was heard from all three reading books, and about one-fourth of the girls were questioned on the meaning.

Writing.—To one half the class the same passage was dictated as was given to Standard V. The other half had to write an essay on 'Cruelty to Animals' or 'Socialists.'

Arithmetic.—Cards for Standard VI.:—

A. (1) How many times is £·005 contained in £50?

(2) If a train travels 1 mile in 2 minutes, how far does it travel in 10 seconds?

(3) If I work 6 days for £2·7, how long shall I work for $\frac{9}{40}$ of £1?

(4) If the proportion of the length of the model of a ship to the length of the ship is as 3 to 280, what proportion would the model bear to 140?

B. (1) Divide ·06 of £2 10s. by 36.

(2) If $\frac{1}{2}$ cwt. cost 9s. 4d., what ought $\frac{1}{4}$ lb. to cost?

(3) How many coins $\frac{1}{10}$ of a shilling in value would amount to 10 guineas?

(4) What fraction of 1 cwt. must be added to $53\frac{1}{3}$ lbs. to make $3\frac{4}{7}$ cwts.?

C. (1) A gentleman owns an estate. He leaves to his eldest son $\frac{1}{2}$, and to his youngest son $\frac{3}{7}$ of the remainder. What is left is worth £2,400. What is the value of the whole estate?

(2) Divide ·0103 by 103, by ·1030, and by ·1013.

(3) Find the simple interest on £25 15s. for 5 years at $3\frac{1}{4}$ per cent. per annum.

(4) Divide the sum of $5\frac{2}{7}$ + $2\frac{1}{4}$ by the difference between $1\frac{1}{14}$ and $\frac{4}{9}$.

Answers.—*A.* (1) 10,000. (2) $\frac{1}{12}$ of a mile. (3) $\frac{1}{2}$ day. (4) $1\frac{1}{2}$.

B. (1) 1d. (2) $\frac{1}{2}$d. (3) 2,100 coins. (4) $3\frac{2}{21}$ cwts.

C. (1) £8,400. (2) ·0001, ·1, ·10167818 +. (3) £4 3s. $8\frac{1}{4}$d. (4) $12\frac{3}{158}$.

Cards for Standard VII.

A. (1) If 42 chests each weighing 35 lbs. cost £70, how many chests each weighing 28 lbs. should I buy for £72?

(2) Three bags of coffee containing respectively 5 cwts., 6 cwts., and 7 cwts. are sold for 63s., 69s., and 72s. per cwt. respectively. Find the average price per cwt.

(3) Four per cent., by weight, of a penny is tin. What weight of tin will there be in £100 worth of pennies if 3 pennies weigh one ounce avoirdupois?

(4) What principal must I invest at 5 per cent. to take out £1,127 10s. at the end of six months?

B. (1) If 6 men can plough 12 acres in 8 days, working 10 hours a day, how many hours a day would 8 men have to work in ploughing 11 acres in 5 days?

(2) A and B can do a piece of work in 4 days. A can do it alone in 6 days. In what time will B do it alone?

(3) By selling a horse for £80 5s. I gain 7 per cent. What did it cost me?

(4) At a sale I bought 7 horses. For the first I gave 55 guineas, for the second 60 guineas, the third 25 guineas, the fourth 20 guineas, for the other three I gave 5 guineas each. What was the average price of each horse?

C. (1) Find the average of $3\frac{3}{8}$, $4\frac{2}{13}$, $3\frac{7}{24}$, and $8\frac{3}{8}$.

(2) If I pay £32 8s. 4d. for reaping 5 acres of land, what wages should I have to pay for 7,260 yds.?

(3) Find Simple Interest on £1,501 at 4 per cent. for $7\frac{1}{2}$ years.

(4) What must I sell a bushel of oats for in order to gain 20 per cent. if I buy a quarter for £36 8s. 4d.?

Answers.—*A.* (1) 54 chests. (2) £3 8s. 6d. (3) 20 lbs. (4) £1,100.

B. (1) 11 hrs. (2) 12 days. (3) £75. (4) £26 5s.

C. (1) $4\frac{41}{52}$. (2) £9 14s. 6d. (3) £450 6s. (4) £5 9s. 3d.

English.—For this subject the upper class (Standards VI. and VII.) was divided into two groups. One group was examined in Grammar and Analysis of sentences chosen from the Poetical Reading Book, questions being asked also on the definition of terms employed. The other group was examined in poetry, all the girls having to recite individually, and to answer questions on the subject and author of the poem.

Mental Arithmetic.—Such questions as the following were asked:—(1) What fraction of £1 is 7s. 6d.? (2) Reduce that to a decimal. (3) Add ·25 to $\frac{6}{8}$ of £1. (4) If I had £1 and gave away $\frac{2}{5}$, and then $\frac{2}{3}$ of the remainder, what money had I left? (5) Add $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$. (6) 100 articles at 6s. 8d. each. (7) 2000 at 5s. each. (8) What is $\frac{7}{8}$ of £1. (9) If I had half an orange, and gave away half of this portion, how much should I have left?

Needlework.—All the girls were examined in groups as in the other Standards, and all the tests were given.

Music.—Standards V. to VII. were examined as Division IV. of the Code. A long voluntary was pointed on the Modulator including fe, se, ta, and transitions. The following Time Test was set on the Blackboard, a few questions being asked before it was sung to 'lah':—

|1 :1.1:— |1 :1 :1 |1.1: :1 |1.1:1 :1 |

The following phrases sung to 'lah' were given as Ear tests. **d' t l s,—s m f r,—m s f l.**

All the *Exceptions* were allowed without demur, and everything was conducted in strict accordance with the Code.

Model Answers to Certificate Questions, Christmas, 1887.

Male and Female Candidates.

FIRST YEAR.

French.

Male Candidates may answer questions in *two* Languages; *Female* Candidates in *one* only.

TWO *hours allowed for this Paper for Male Candidates;* THREE *hours for Female Candidates.*

SECTION I.

Translate into English the following passage:—

Le prieur du monastère de la Rabida était plus versé dans les sciences relatives à la navigation qu'il n'appartenait à un homme de sa profession. Son monastère d'où l'on voyait la mer, et voisin du petit port de Palos, un des plus actifs alors de l'Andalousie, avait mis le moine en société habituelle avec les navigateurs et les armateurs de cette petite ville, uniquement adonnée à la marine. Ses études, pendant qu'il avait habité la capitale et la cour, avaient été tournées vers les sciences naturelles, et vers les problèmes qui s'agitaient alors dans les esprits.

The prior of the monastery of La Rabida was more learned (versed) in the sciences relating to navigation than is usually the case with a man of his profession. His monastery from which the sea could be seen and which was near the little port of Palos, at that time one of the busiest in Andalusia, had brought the monk into constant contact with the navigators and shipowners of this little town, solely engaged in maritime occupations. His studies, whilst he lived in the capital and at the court, had been directed to the natural sciences, and towards those problems which were at that time agitating men's minds.

SECTION II.

Translate into French the following passages:—

1. A whole people followed him with blessings to the gate of that humble convent, where, alone, on foot, with his little child, he had, some years before, sought hospitality.

2. Before the age at which one generally learns by sad experience to know men, he understood them.

3. Man is like the ocean. He has a natural aptitude for movement.

4. I will put my ornaments and my diamonds in pledge, in order to assist in paying the expenses of the armament.

1. Un peuple entier le suivait en le bénissant à la porte de cet humble couvent, où il avait demandé, seul, à pied, avec son enfant, quelques années auparavant, l'hospitalité (des mendiants).

2. Avant l'âge où l'on apprend généralement par une triste expérience à connaître les hommes, il les comprenait.

3. L'homme est pareil (semblable, ressemble) à l'océan. Il a une aptitude naturelle pour le mouvement.

4. Je mettrai mes bijoux et mes diamants en gage pour subvenir aux frais de l'armement.

SECTION III.

1. (*a*) Put the indefinite article *un* or *une*, according to the gender, before the following nouns:—*Filou, chou, langue, bal, aïeul, cheval, attirail, pied, feu.*

(*b*) Put the same nouns *into the plural*, prefixing them either with the *definite* or *indefinite* article.

2. Give the *feminine form* of the following substantives and adjectives:—*Homme, père, berger, roi, empereur, ambassadeur, faux, curieux, premier, doux, léger, franc, contemplatif, frais.*

3. Give a table of the *possessive adjectives* and of the *relative pronouns.*

4. Conjugate the *present indicative, future* and *present subjunctive* of the following verbs:—*pénétrer, pouvoir, devenir, suivre.*

5. Parse fully:—

Colomb dans sa pensée aspirait à compléter le globe, qui lui paraissait manquer d'une de ses moitiés.

1. (*a*) Un filou, un chou, une langue, un bal, un aïeul, un cheval, un attirail, un pied, un feu.

(*b*) Les filous, les choux, les langues, les bals, les aïeuls (= grandfathers); aïeux (= ancestors), les chevaux, les attirails, les pieds, les feux.

2. Femme, mère, bergère, reine, impératrice, ambassadrice, fausse, curieuse, première, douce, légère, franche, contemplative, fraîche.

3. Table of Possessive adjective pronouns (conjunctive).

SINGULAR.		PLURAL.	
Masc.	*Fem.*	*Masc. and Fem.*	
mon	ma	mes	my
ton	ta	tes	thy
son	sa	ses	his, her, its, one's
notre	notre	nos	our
votre	votre	vos	your
leur	leur	leurs	their

DISJUNCTIVE.

		Masc.	*Fem.*	
le mien	la mienne	les miens	les miennes	mine
le tien	la tienne	les tiens	les tiennes	thine
le sien	la sienne	les siens	les siennes	his, hers, its
le nôtre	la nôtre	les nôtres	les nôtres	ours
le vôtre	la vôtre	les vôtres	les vôtres	yours
le leur	la leur	les leurs	les leurs	theirs

4.	PRESENT INDICATIVE.	PRESENT SUBJUNCTIVE.	FUTURE.
je	pénètr-e	pénètr-e	pénètr-er-ai
tu	pénètr-es	pénètr-es	pénètr-er-as
il	pénètr-e	pénètr-e	pénètr-er-a
nous	pénétr-ons	pénétr-ions	pénètr-er-ons
vous	pénétr-ez	pénétr-iez	pénètr-er-ez
ils	pénètr-ent	pénètr-ent	pénètr-er-ont

NOTE.—The acute accent on the final *é* of the stem must be changed into the grave (è) before the *unpronounced* endings *e, es, ent* and before the endings of the future and conditional (erai and erais).

	PRESENT INDICATIVE.	PRESENT SUBJUNCTIVE.	FUTURE.
je	peux or puis	puiss-e	*pour-r-ai
tu	peux	puiss-es	pour-r-as
il	peut	puiss-e	pour-r-a
nous	pouvons	puiss-ions	pour-r-ons
vous	pouvez	puiss-iez	pour-r-ez
ils	peuvent	puiss-ent	pour-r-ont

* pour-r-ai by assimilation for pouv-r-ai which is an abbreviated pouv-oir-ai.

	PRESENT INDICATIVE.	PRESENT SUBJUNCTIVE.	FUTURE.
je	de-vien-s	de-vienn-e	de-vien-d-r-ai
tu	de-vien-s	de-vienn-es	de-vien-d-r-as
il	de-vien-t	de-vienn-e	de-vien-d-r-a
nous	de-ven—ons	de-ven-ions	de-vien-d-r-ons
vous	de-ven—ez	de-ven-iez	de-vien-d-r-ez
ils	de-vienn-ent	de-vienn-ent	de-vien-d-r-ont

NOTE.—The stem *ven* is strengthened by the insertion of an i before the unpronounced endings e, es, ent, s, s, t. The *n* is doubled on the same principle as the *l* and *t* are doubled in such verbs as appel-er and jet-er before the endings e, es, ent, future and conditional. The *d* is inserted between *n* and *r* in the future just as we have inserted *d* between *n* and *r* in thun-d-er, Yorkshire thun-ner, German Don-ner. Viendr-ai = vienr-ai = venir-ai. The fut. is formed from infinitive.

	PRESENT INDICATIVE.	PRESENT SUBJUNCTIVE.	FUTURE.
je	sui-s	suiv-e	suivr-ai
tu	sui-s	suiv-es	suivr-as
il	sui-t	suiv-e	suivr-a
nous	suiv-ons	suiv-ions	suivr-ons
vous	suiv-ez	suiv-iez	suivr-ez
ils	suiv-ent	suiv-ent	suivr-ont

5.
Colomb—proper noun, masc., sing., nom. to 'aspirait.'
dans—prep. gov. 'pensée.'
sa—poss. adj. pron., fem., sing., agr. with 'pensée.'
pensée—noun, fem., sing., gov. by 'dans.'
aspirait—reg. verb, 1st conj., indic., imperf., 3rd, sing., agr. with 'Colomb.'
à—prep. required by 'aspirait' before the infinitive 'compléter.'
compléter—reg. verb, trans., 1st conj., infin., gov. by 'aspirait.'
le—def. art., masc., sing., agr. with 'globe.'
globe—noun, masc., sing., acc., gov. by 'compléter.'
qui—rel. pron., masc., sing., agr. with 'globe' and nom. to 'paraissait.'
lui—conj. pers. pron., masc., sing., dative case, gov. by 'paraissait.'
paraissait—irreg. verb, intrans., indic., imperf., 3rd, sing., agr. with 'qui.'
manquer—reg. verb, infin., 1st conj., gov. by 'paraissait' without prep.
d'une—genit. case of indef. art., fem., sing. (= une moitié).
de—prep. gov. 'moitiés.'
ses—poss. adj. pron., plur., fem., agr. with 'moitiés.'
moitiés—noun, plur., fem., gov. by 'de.'

Male and Female Candidates.

SECOND YEAR.

French.

Male Candidates may answer questions in *two* languages; *Female* Candidates in *one* only.

TWO *hours allowed for this Paper for Male Candidates;* THREE *hours for Female Candidates.*

SECTION I.

Translate into English the following passages :—

(*a*) La nature, dit Colomb, y est si prodigue, que la propriété n'y a pas créé le sentiment de l'avarice, ou de la cupidité. Ces hommes paraissent vivre dans un âge d'or, heureux et tranquilles au milieu de jardins ouverts et sans bornes, qui ne sont ni entourés de fosses ni divisés par des palissades, ni défendus par des murs. Ils agissent loyalement l'un envers l'autre, sans lois, sans livres, sans juges. Ils regardent comme un méchant homme celui qui prend plaisir à faire mal à un autre.

(*b*) C'est pourtant un cruel et rude sacrifice?
Je n'aurais cru jamais—ô faibles cœurs humains!
Qu'on pût tenir autant au travail de ses mains,
Et que l'âme de feu d'un artiste eût en elle
Ce foyer de tendresse émue et paternelle.
Je t'aimais bien, ô cher ouvrage que je fis!
Adieu donc pour toujours, mon chef-d'œuvre, mon fils!
Je puis me pardonner ma faiblesse dernière;
Car dans ce coffre étroit et noir comme une bière
Je crois, en te posant, tant j'ai le cœur en deuil,
Que c'est mon enfant mort, que je couche au cercueil.

(*a*) Nature, said Columbus, is there so prodigal (luxuriant) that property has not created the feeling of avarice or greed. These men seem to live in a golden age, happy and peaceful amid gardens uninclosed (open), and without boundaries. They are neither surrounded by ditches nor separated (divided) by palisades, nor protected by walls. They act loyally towards one another, without laws, books, or judges. They consider him as a wicked man who takes a delight (who delights) in doing harm to his neighbour.

(*b*) It is nevertheless a harsh and cruel sacrifice!
I could never have believed—poor weak human hearts!
That one could cling so much to the work of one's hands,
And that the artist's fiery soul could contain (hold) in itself
That flame (lit. hearth) of tenderness (so) profound and paternal.
I loved thee well, dear work of my hands (lit. which I made)!
Adieu then for ever, my masterpiece, my offspring!
I can forgive my last weakness;
For in the coffer, narrow and dark as a bier,
I fancy, while putting thee therein, so troubled is my heart (lit. so much is my heart in mourning).
That it is my own dead child whom I am consigning to the tomb.

SECTION II.

Translate into French the following passages :—

1. The scene of confusion amid which Heriot found the King seated was no bad picture of the state and quality of James's own mind. There was much that was rich and costly in pictures and valuable ornaments; but they were arranged in a slovenly manner, covered with dust, and lost half their value, or at least their effect, from the manner in which they were presented to the eye. The table was loaded with huge folios.

2. What a contrast there was between the condition of these happy peoples at the moment when the Europeans discovered them, and the state into which the unfortunate Indians fell a few years after the visit of these pretended emissaries of civilization.

3. When I began this work of mine, I constructed well, with all needful care, the case of old fir wood, and the handle of maple wood.

4. How much courage is needed!

5. You have not taken on yourself the vows of a knight.

6. One of the ships had sprung a leak.

1. La scène de confusion où Heriot trouva le roi assis n'était pas une mauvaise peinture de l'état et des qualités de l'esprit personnel de Jacques. Il y avait parmi ces objets un grand nombre de tableaux et de bijoux riches et couteux; mais ils étaient arrangés negligemment et couverts de poussière. Ils perdaient ainsi la moitié de leur valeur ou au moins leur effet par la manière qu'ils étaient présentés à la vue. La table était chargée d'énormes in-folio.

2. Quel contraste il y avait entre la condition de ces heureux habitans au moment où les Européens en faisaient la découverte, et l'état dans lequel ces malheureux Indiens tombaient quelques années après la visite de ces prétendus émissaires de la civilisation.

3. Lorsque je commençais ce travail, j'y mettais tous mes soins. Je faisais (établissais) la caisse en vieux sapin avec un manche d'érable.

4. Que de courage il faut avoir!

5. Vous n'avez pas (encore) prononcé (fait) les vœux d'un chevalier.

6. Un des vaisseaux avait fait eau.

SECTION III.

1. Parse fully (*a*) or (*b*) :—

(*a*) Ah ! je les ai voulu retenir, mais en vain,
Et j'ai, pour une fois, mis de l'eau dans mon vin.

(*b*) Ce fantôme de l'Asie, qui l'avait conduit au bord de l'Amérique, s'interposait maintenant entre l'Amérique et lui...

2. Explain the following constructions, and translate them into English :—

Servir à rien.
Servir de rien.
C'est ici que je demeure.
J'ai beau parler, personne ne répond.
Cela ne laisse pas de m'inquiéter.

3. In what cases do you suppress *the article* before *French nouns?* Frame a short French sentence about every rule you quote.

4. What are the *three chief rules* of the agreement of the Past Participle.

5. Give the primitive tenses and future tenses of the following verbs :—*manger*, *apprendre*, *renoncer*, *juger*, *subvenir*, *abattre*, *pourvoir*.

1. (*a*)

Ah!—interjection.
je—conj. pers. pron., 1st pers., sing., nom. to 'ai.'
les—conj. pers. pron., 3rd pers., plur., acc., gov. by 'retenir.'
ai—auxil. verb (avoir), indic., pres., 1st pers., sing., agr. with nom. 'je.'
voulu—past part. of irreg. verb 'vouloir.'
ai voulu—is the past indefinite of vouloir.
retenir—infin. mood of irreg. verb, and gov. by voulu without any preposition.
mais—conjunction.
en vain—adverbial phrase mod. 'ai voulu' understood.
et—conjunction.
j'ai—see above.
pour—prep. gov. 'fois.'
une—indef. art., fem., sing.
fois—noun, fem., sing., gov. by 'pour.'
mis—past part. of irreg. verb 'mettre.'
ai mis—is the past indefinite of 'mettre.'
de la—partitive art., fem., sing., agr. with 'eau.'
eau—noun, fem., sing., acc., gov. by 'ai mis.'
dans—prep. gov. 'vin.'
mon—conj. poss. adj. pron., masc., sing., agr. with 'vin.'
vin—noun, masc., sing., gov. by 'dans.'

(*b*)

Ce—dem. adj. pron., masc., sing., agr. with 'fantôme.'
fantôme—noun, masc., sing., nom. to 'interposait.'
de la—genit., sing., fem. of def. art.
Asie—noun, fem., sing., genit. case, gov. by 'fantôme.'
qui—relat. pron., masc., sing., nom. to 'avait conduit.'
le—conj. pers. pron., masc., sing., acc. gov. by 'avait conduit.'
avait—auxil. verb (avoir), indic., imperf., 3rd pers., agr. with 'fantôme.'
conduit—past part. of irreg. verb 'conduire.'
avait conduit—is the pluperfect tense of 'conduire.'
au = *à le*—dat. case, sing., masc., of def. art. (contracted).
bord—noun, masc., sing., dat. case.
de la—genit. case, fem., sing. of def. art.
Amérique—proper noun, fem., sing., gen. case, gov. by 'bord.'
s' = *se*—reflex. pron., 3rd, sing., masc. (= fantôme), acc., gov. by 'interposait.'
interposait—reflex. verb, reg. (interposer), indic., imperf., agr. with nom. 'fantôme.'
maintenant—adv. time mod. 's'interposait.'
entre—prep. gov. 'l'Amérique.'
l'Amérique—see above.
et—conj.
(entre) lui—disj. pers. pron., masc., sing., gov. by 'entre' understood.

2. Cela ne *sert à rien* de mentir, it avails not (it is useless) to lie.

Cela ne m'a *servi de rien*, that has availed me nothing.
[Je me *sers d'*un crayon, I make use of a pencil.]
[Il leur a *servi de* père, He has been a father to them.]

'It is here that I live' is a more emphatic form of the simple sentence, *je demeure ici* = I live here.

'*It is in vain for me* to speak, no one replies.' Avoir beau = to be in vain. Cf. our '*it is all very fine for you* to say that.' J'ai beau parler, is literally, 'I have fine to speak.' J'ai (tu as, il a, nous avons, vous avez, ils ont) beau parler = It is in vain for me (thee, him, us, you, them) to speak. J'*avais* beau = it *was* in vain for me... J'*aurai* beau = it *will be* in vain for me...

Ne laisser pas de = nevertheless, for all that. *Cela ne laisse pas de* m'inquiéter = Nevertheless (for all that) I am troubled by that [lit. that does not leave troubling me].

3. (*a*) The article (partitive) is suppressed when the adjective stands before the noun, as: j'ai de *belles* maisons. (*b*) After adverbs of quantity, a collective noun, and in general after the following words: beaucoup *de* courage; une multitude *de* peuples; une sorte *de* fruit; un genre *d'*ouvrage; un monceau *d'*argent; une pile *de* livres; un nombre *d'*hommes. NOTE.—After the adv. of quantity *bien*, the article is employed. (*c*) After verbs used negatively, as: je n'ai pas *d'*argent. (*d*) Before the material of which a preceding noun is made, as: cheminée *de* marbre (a marble chimney-piece); maison *en* bois (a wooden house). (*e*) Une table *à* tiroir (a table with drawers); un moulin à vent (a windmill). (*f*) After *sans*, *avec*, *ni*, *en*, etc., as: sans mérite (without merit); avec sagesse (wisely); il n'a *ni* parents *ni* amis (he has neither relatives nor friends); plein *de* charmes; doué *de* vertu (endowed with virtue); en roi (like a king); en homme sensé (like a sensible man). (*g*) After certain locutions with *avoir faire*, etc., avoir soif, avoir faim, faire voile (to set sail.) (*h*) Before nouns used adjectively, as: Je suis Français; il est médecin; vous êtes négociant (But *c'*est *un* médecin; *c'*est un négociant, etc.) (*i*) In enumerations, as: hommes, femmes, enfants, tout périt. (*j*) In proverbs, as: pauvreté n'est pas vice. (*k*) Titles of books, as: Essai sur le Goût (*an* Essay on Taste). (*l*) Before cardinal numbers, as: livre dix (book *the* tenth); Edouard deux (Edward *the* Second). (*m*) Before nouns in apposition, as: Marseille, *ville* de France. (*n*) After *quel*, as: quel homme! quel malheur! (what *a* man! what *a* misfortune!) (*o*) Before *plus* and *moins*, as: *plus* on a, etc. (*the* more one has...) (*p*) After *en* and *de* before countries, as: il est *en* Angleterre; elle vient *de* France; J'arrive *d'*Italie.

4. *Rule I.*—The past participle used without an auxiliary verb agrees like an adjective, in gender and number, with the noun to which it belongs, as: un homme tué, a man killed; des hommes tués; une femme tuée; des femmes tuées.

Rule II.—The past part. conjugated with *être* agrees with the subject of être, as: Le billet *est* écrit; les billets *sont* écrits; la lettre *est* écrit-e; les lettres *sont* écrit-es.

Rule III.—The past part. conjugated with *avoir* is invariable, as: il *a* écrit la lettre; ils *ont* écrit les lettres; elle *a* écrit une lettre; elles *ont* écrit des lettres.

5.

INFINITIVE.	PRES. PART.	PAST PART
mang-er	mang-e-ant	mang-é (e)
apprend-re	ap-pren-ant	ap-pris (e)
renonc-er	renonç-ant	renonc-é (e)
jug-er	jug-e-ant	jug-é (e)
sub-ven-ir	sub-ven-ant	sub-ven-u (e)
a-batt-re	a-batt-ant	a-batt-u (e)
pour-voir	pour-voy-ant	pour-vu (e)

PAST DEFINITE.	FUTURE.
mang-e-ai	mang-er-ai
ap-pris	ap-prendr-ai
renonç-ai	renonc-er-ai
jug-e-ai	jug-er-ai
sub-vin-s	sub-viendr-ai
a-batt-is	a-battr-ai
pour-vus	pour-voir-ai

NOTE.—When the stem of a verb ends in *g* the vowel *e* must be inserted before all endings beginning with *a* or *o*. When the stem ends in *c* a cedilla must be placed under the ç before all endings beginning with *a* or *o*.

Female Candidates.

SECOND YEAR.

Geography.

[THREE hours allowed for this Paper.]

No Candidate is permitted to answer more than EIGHT questions, and the first question should not be omitted by any.

1. Draw a map (occupying the enclosed space) of New Zealand, Australia, *or* the Dominion of Canada.

2. Name the largest in size of the British Colonies and Dependencies in Europe, in Asia, in Africa, and in America, and the principal exports of each of the four.

(1) In Europe the largest Dependency is *Cyprus*. Its exports are cotton, madder, wheat, locust beans, sago, linseed, and wine.

(2) In Asia *India* is by far the largest. The exports are wheat, raw cotton, jute, tea, rice, linseed, indigo, leather, hides, sugar, wool and coffee.

(3) *Cape Colony*, in Africa, exports wool, copper ore, ostrich feathers, hides, ivory, diamonds, mohair, and wines.

(4) The *Dominion of Canada* exports timber, potash, horses, sheep, cattle, butter, cheese, eggs, corn, copper ore, and dried fish.

3. What are the principal railways in India? Describe a journey by one of them.

The following are the chief railways in India.

(1) *Bombay, Baroda and Central India*, from Bombay through Surat to Ahmedabad.

(2) *East Indian*, from Calcutta to Delhi.

(3) *Great Indian Peninsula*, Bombay to Jubbulpore.

(4) *Great Southern of India.*

(5) *The Madras Railway.*

(6) *Scinde, Punjaub and Delhi.*

The East Indian Railway leaves Calcutta and the Ganges on the left, and touches first the town of Burdwan. It then crosses the plains of Plassy without entering either Plassy or Moorshedabad. Its course further north inclines towards the river on account of the approach eastward of the Rajmahal Hills. It now for many miles follows the windings of the river, keeping fairly close to the right bank until the town of Patna is reached. Soon after leaving Patna it crosses the Sone by a large bridge. The many windings of the river in this portion of the journey are not closely followed. Benares is here seen on the opposite side of the Ganges. The bridge across the Jumna is considered one of the finest engineering operations in the Dependency. Allahabad is reached immediately upon crossing the bridge, and here the most important branch railway to Jubbulpoor connects the East Indian Railway with the Great Indian Peninsular Railway, and by it with Bombay. The further course of the railway is between the two rivers Ganges and Jumna, through Cawnpore to Delhi.

4. Give some account of our first settlement in India, and of the successive additions to our possessions there.

In 1599 a few private individuals in London associated for commercial purposes under the name of *The Governor and Company of Merchants of London trading to the East Indies.* This company established trading depots at Surat, Ahmedabad and Cambay in 1611. From this small beginning arose the British Empire in India.

The following were the periods of chief acquisition of the different portions of India:—

1760—70. Bengal, Masulipatam, Burdwan and North Circars. *Lord Clive*, Governor General.

1771—85. During the rule of *Warren Hastings*, the district of Benares was annexed, Penang and Salsette were purchased.

1786—90. Under *Lord Cornwallis* the cession of Malabar was completed.

1797—1805. The *Marquis of Wellington* made more important annexations than any of his predecessors. The chief districts added to British rule at this time were Canara, Coimbatore, Tanjore, Nizam's Dominions, The Carnatic, Lower Dooab, Allahabad, The Upper Dooab, with Delhi and Gujerat.

1812—22. *Marquis Hastings* added Kumaon, Ahmedabad Candeish, Poonah, S. Mahratta and Bejapore.

1822—28. *Lord Amherst* annexed large possessions in Further India, together with Patna.

1847—55. *Marquis Dalhousie*, after the conclusion of the second Sikh war, obtained possession of the Punjaub, followed by the cession of Pegu and Nagpoor.

1855—61. *Viscount Canning* obtained possession of the important province of Oude.

1857 was the period of the Indian Mutiny, after which the Government of India became vested in the Queen (1858), who became *Empress of India*, 1876.

In more recent years the boundary on the N.W. has been extended towards Afghanistan. The last annexation was that of Burmah, 1885.

5. Give notes of a lesson for the highest class on the causes and uses of Colonisation.

(*a*) CAUSES OF COLONISATION.

(1) *Love of adventure, discovery, enterprise.*—Relate events in the life of such men as Raleigh and Drake, whose chivalry and daring made the reign of Elizabeth so remarkable for discovery and enterprise. Then lead the class to see that their discoveries awoke the desire to conquer and occupy.

(2) *The desire to obtain wealth and position.*—Contrast with first cause. Love of adventure only led to temporary occupation. When men united for commerce and gain, their settlements became permanent. For example, cite the case of India, where a trading company founded the present British Empire, and show how the daring of the explorers of Elizabeth's reign became of value only when such trading companies as that of Virginia followed.

(3) *Discontent at home.*—The Virginian colony, in America, arose out of *social distress*, the establishment of the New England on account of *religious* strife at home. In our day, the vast emigration from Ireland arises from *social* and *political* causes.

(*b*) USES OF COLONISATION.

(1) Colonies afford a home for the surplus population of the mother country. Good examples of this at the present time are afforded by the emigration of our countrymen into our Australasian and American possessions.

(2) The Colonies furnish a market for British manufactured goods: whilst our exports to foreign countries have recently been unsteady and at times lessened, those to our Colonies have been maintained, and in some cases increased.

(3) The Colonies produce a vast supply of raw material for our home manufactures. In this way the interchange of raw material for home manufactured goods produces a healthy and valuable trade for both communities.

(4) Such possessions as Gibraltar, Malta, Aden, Singapore, &c., are very valuable from a naval, military and commercial point of view.

6. What are the principal industries of the people in—(1) Jamaica; (2) Cape Colony; and (3) Tasmania?

(1) In Jamaica the occupation of the people is chiefly that of cultivating the sugar plantations and extracting the juice from the cane. The cultivation of coffee and spices engages a large number of people whilst many others are occupied in the logwood and other valuable timber trade for which the island is famous.

(2) In Cape Colony the chief industry of the settlers is that of producing wool, and the rearing of sheep, horses and cattle. The soil is tilled for wheat, grapes (for wine) and slightly tobacco, sugar cane and arrowroot. The rearing of ostriches is now a recognised industry. Amongst the mining industries those of copper mines, and gold and diamond digging are the most valuable.

(3) Tasmania. The chief industries of Tasmania are sheep and cattle rearing, the cultivation of the soil for wheat and fruit, the mining of coal, iron and copper, and the felling of timber.

7. Give a list of all our Colonies and Dependencies in the Western Hemisphere, in the order of their population and importance.

Dominion of Canada.—

	Inhabitants.
Ontario	2,000,000
Quebec	1,360,000
Nova Scotia and C. Breton	440,000
New Brunswick	320,000
British Guiana	250,000
Newfoundland	180,000
Trinidad	150,000
Prince Edward's Is.	108,000
Jamaica	80,000
Manitoba	66,000
N.W. Territory	56,000
British Columbia	50,000
Bahamas	44,000
Honduras	27,000
Bermudas	14,000
Falkland Islands	1,400

8. Give some account of the climate of Australia, and of the principal animals to be found there. Remark on any differences you have observed in the description of the native animals of Australia and the animals of the Asiatic Continent.

A. Climate.—Australia ranges over 30° of latitude and in the northern regions approaches to within 12° degrees of the Equator. The settled districts are for the most part near the coast and hence the extremes of climate found on continental areas are not experienced.

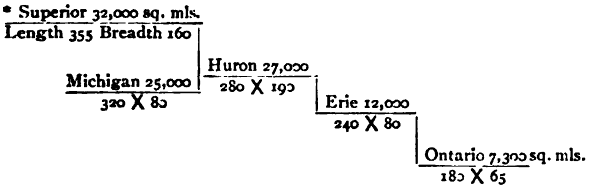
Leaving out of account the extreme north of Australia it is true of the southern and south eastern colonies that the climate is much warmer than that of England and that there is more rain; the great drawbacks to the climate are (1) the *periodical droughts*, (2) the *hot winds* from the interior.

B. Animal Productions.—(1) All the European animals of value to man have been introduced and thrive.

(2) Animals peculiar to Australia are the Kangaroo, Wombat, Ornithorynchus, Emu, Iguana and Opossum.

The species of animal found native in Australia are almost entirely distinct from those found on the Asiatic mainland. The pouched animals especially may be quoted as entirely wanting in Asia whilst they are amongst the most abundant in Australia.

9. Describe with the aid of a map the great lakes of British North America.



Lake Superior is about the size of Ireland, it is over 600 ft. above the sea level. Its shores are bleak. Copper and silver are the most valuable productions near.

Lake Michigan is entirely in the United States.

Lake Huron receives the water of Lake Michigan. Its northern extension is termed the Georgian Bay. Fishing is abundant in its water and good copper mines abound round its shores.

Lake Erie is about twice the size of Yorkshire. Its waters are subject to considerable disturbance by storm. The trade along this lake is considerable and chiefly between ports Stanley, Dover and Colborne.

The Niagara Falls are between Lake Erie and Lake Ontario. For purposes of navigation the Welland Canal has been cut from Port Colborne on Lake Erie to Port Dalhousie on Lake Ontario.

Lake Ontario is smaller than any of the preceding lakes. On account however of the denser population surrounding it and the industries developed on its shores it is by far the most important of the great lakes. The chief towns on Lake Ontario are Kingston, Cobourg, Toronto and Hamilton.

10. Give some particulars respecting India, as respects—(1) the races which inhabit it; (2) its government; and (3) its religion.

(1) RACES WHICH INHABIT INDIA.

(*a*) The *Hindoos*, divided into the following four castes: Priests (Brahmins), Warriors, Merchants, and Servile tribes.

(*b*) *Mohammedans*, consisting mainly of two sects, viz., (1) the Arabs, Turks, Afghans and Rohillas, and (2) the Persians.

(*c*) *Parsees*, who came originally from Persia, and are for the most part wealthy merchants.

(2) GOVERNMENT OF INDIA.

The Queen is Empress of India, and governs by the following agents:—

(*a*) *In India*, a Viceroy, assisted by a Council, by two Governors (Madras and Bombay), and by Lieutenant Governors and Chief Commissioners in other districts.

(*b*) *In England*, by a Secretary of State assisted by a Council.

(3) RELIGION.

(*a*) Mohammedanism chiefly prevails in the Punjaub, Central Provinces and Bengal.

(*b*) The Buddhists are very numerous throughout India.

(*c*) The Parsees are fire-worshippers. They are not so numerous as either of the other sects named.

11. Say what you know of any five of these places—Lucknow, Port Elizabeth, Ottawa, Poonah, Brisbane, the Punjaub, St. Helena, Heligoland, Winnipeg, the Fiji Islands, Barbadoes, Penjdeh.

1. *Lucknow*, on the Goomtee, is the capital of Oude, and notorious for the atrocities of the Sepoys during the Indian Mutiny, and the gallant relief by Sir Henry Havelock.

2. *Port Elizabeth* is on the coast of Cape Colony, near Algoa Bay. It is the chief port for the eastern districts of the colony, and is especially remarkable for the amount of wool it exports.

3. *Ottawa*, capital of the Dominion, is situated on the River Ottawa, not far from the Rideau Falls. It is the centre of an immense lumber trade.

4. *Poonah*, on the hill country, south-east of Bombay, and connected with it by the Indian Peninsula Railway.

5. *Brisbane*, capital of Queensland, and situate on Moreton Bay. It has great trade in wool.

12. Explain what is meant by the Dominion of Canada, and give some account of its origin and constitution.

Formerly, British North America consisted of a number of Provinces, each with a separate Government. The chief of these were Upper and Lower Canada.

The Dominion is a Confederation of the several Provinces forming British North America, with the exception of Newfoundland, which, as yet, is not united to the Dominion.

Each Province retains a Legislature of its own, and these, as well as the Central Government at Ottawa, are modelled on that of England. Each Province has a Governor, an Executive Council, a Senate, and a Legislative Assembly. The Governor General and Central Government are at Ottawa. The Legislative assemblies are elected for five years; the number of members is based upon the population. Matters of justice, trade, customs, militia, defence, and postage are under the control of the Central Government at Ottawa; other matters are under local control.

13. Who are the Bushmen, the Red Indians, the Cingalese, the French Canadians, and the Sikhs respectively?

1. The *Bushmen* (Bosjesman) are the degraded natives who inhabit the district north of Cape Town.
2. The *Red Indians* are the natives of North America.
3. The *Cingalese* are native inhabitants of Ceylon, and are descended from Colonists from the Valley of the Ganges.
4. The *French Canadians* are the descendants of the original French settlers. They are most numerous in Quebec and Nova Scotia.
5. The *Sikhs* are a very important tribe of East Indians. They lived, when an independent community, in the north of India. Lahore was their seat of Government.

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* Arrangement taken from Faunthorpe's 'Colonies.'

Male Candidates.

FIRST AND SECOND YEARS.

English History.

(*Two hours and a half allowed for this Paper.*)

Candidates are not permitted to answer more than EIGHT questions, and are advised to answer the last.

(1) Give some account of three of the following persons:—*Hereward the Wake*, *Wycliffe*, *Warwick the King-maker*, *Strafford*, *The Young Pretender*, *Warren Hastings*.

1. *Hereward* was an outlaw who gathered round him a desperate band of patriots in order to oppose the complete subjugation of England by William the Conqueror. Nowhere did William find a more obstinate resistance to his authority than that led by Hereward in the marshes and fens of Cambridgeshire. In 1071 William succeeded in dislodging his brave foes and thus became complete master of the English.

(2) *Strafford* was a powerful minister in the reign of Charles I. He devised a system of government which he deemed to be 'thorough,' and for some years he applied the system to his rule in Ireland. His chief opponents in England were J. Hampden and his rival Archbishop Laud. The hatred of the people against him was intense; he sought to make the king absolute, and the king in return, when his minister was impeached by Pym for high treason, handed him over to justice. He was executed at the Tower in 1641.

(3) *The Young Pretender* was the grandson of James the second. In the year 1745 aided by the French he effected a landing in Scotland and was soon at the head of 5,000 Highlanders. With these he defeated a small English force at Preston Pans. He then marched southward into England as far as Derby, but failing to rouse the English in his favour he retired towards Glasgow and defeated the English at Falkirk, to be himself hopelessly vanquished a few weeks later at Culloden Moor, 1746. Charles Edward after many strange adventures succeeded in escaping to France.

(2) When, between whom, and with what immediate results were the following battles fought:—*The Standard*, *Bosworth*, *Worcester*, *Sedgemoor*, *Plassey*, *Vittoria*?

(1) Battle of the *Standard* (1138) was fought between the Scotch under King David, and the northern barons under Thurstan, Archbishop of York. The immediate result was the entire defeat of the Scotch and their withdrawal from the country. In the following year peace was concluded, and Henry, the son of the Scotch king, became Earl of Northumberland.

(2) Battle of *Bosworth* was fought 1485 between Richard III. and his rival claimant to the throne, Henry, Earl of Richmond. Richard was defeated and slain, and Henry was made king.

(3) The battle of *Worcester* (1651) followed an attempt on the part of Prince Charles to invade England. Cromwell, who was in Scotland, followed the Prince, and the armies met at Worcester. Cromwell was victorious, and Charles escaped to France.

(4) *Sedgemoor* was fought 1685 between the forces of Monmouth and those of King James II. The royal forces were victorious, and Monmouth fled, soon to be captured and executed.

(5) *Plassey* (1757). This battle was fought by the English under Clive, and ended in the complete overthrow of the Indian army under Sarajah Dowlah.

(6) *Vittoria*. In 1813 Wellington, who for a time had been compelled to withdraw into Portugal, again marched into Spain, and completely routed the French at Vittoria, and compelled them to retire beyond the Pyrenees.

3. Describe briefly the steps taken by Edward I. to consolidate his kingdom. Explain the terms *the Pale*, *the Marches of Wales*, *the Cinque Ports*.

Edward first determined upon the subjugation of Wales. Under pretext of Llewellyn refusing to swear fealty the king marched to Chester, and there received the homage of the Welsh Prince. The following year David of Wales raised an insurrection against the English king, which was, however, immediately suppressed, the Welsh Prince slain, and his brother David executed. Wales was then formally annexed to the English throne.

Affairs being in a disturbed state in Scotland, Edward, with a view to the future union of the two kingdoms, betrothed his son Edward to the infant Princess of Scotland. She died, however, and Edward espoused the cause of Baliol against Bruce. Being dissatisfied with Baliol Edward made war upon the Scotch and defeated them at Dunbar, and there received the homage of the Scottish nation. Further troubles arose in Scotland, where rebellions were headed by Wallace and Bruce, and whilst on his way to oppose the latter Edward died at Burgh-on-Sands, 1307.

The Pale, a district in Ireland, including Drogheda, Dublin, Wexford, Waterford, and Cork. Every Irishman beyond the 'Pale' was deemed an enemy and a robber, and his murder was not cognisable by law. The Pale, as a district, was first recognised during the reign of Henry II. It remained a more or less distinct area until King Henry VIII. assumed the title of 'King of Ireland.'

The *Marches of Wales* were the borders of Wales upon which William the Conqueror built castles and placed in them nobles who were allowed all the land they could conquer from the Welsh. These barons were called 'Lord Marchers.'

The Cinque Ports are situated along the coast of Sussex and Kent, and include the ports of Dover, Sandwich, New Romney, Hythe and Hastings. They were established by the Conqueror, and, in return for certain privileges, furnished a large number of war ships.

4. State, with dates, what you know of three of the following:—*Constitutions of Clarendon*, *Statute of Labourers*, *Petition of Right*, *Union of Ireland with England*.

(1) *The Constitutions of Clarendon* (1164). The chief clauses in these were—(*a*) The prelate was bound to do homage to the king for his lands before consecration, and to hold his land as a barony from the king; (*b*) no bishop might leave the realm without the royal permission; (*c*) no royal servant, nor tenant in chief, should be excommunicated but by the king's consent; (*d*) suits between clerk and layman were to be decided in the king's courts.

In these and other ways mentioned in further clauses the power of the clergy was to be limited.

(2) *The Petition of Right* was framed in 1628 to guard against the recurrence of the following grievances:—(*a*) compulsory loans to the crown; (*b*) arrest without lawful cause expressed; (*c*) billeting soldiers in private houses; (*d*) trial of the military by martial law in place of the law of the land; (*e*) punishment, outlawry, or deprivation of goods otherwise than by lawful judgment of one's peers.

(3) *The Statute of Labourers* (1349) enacted that 'Every man or woman not having of his own whereof to live, and not serving another, shall be bound to serve the employer who shall require him to do so at the ordinary wage of the neighbourhood.' A refusal to obey was to be punished by imprisonment.

Further, the labourer was forbidden to leave his parish in search of better work and wages, and if he did he was pronounced a fugitive and subject to imprisonment. At this time, and no doubt the outcome of these repressive measures, a certain John Ball became a popular preacher of resistance to these unjust laws. To him we owe the doctrine embodied in the lines:

> 'When Adam delved and Eve span
> Who was then the gentleman?'

5. Explain clearly the claims of William I., James I., William III., and George I., to the throne. What did the terms 'Whig' and 'Tory' mean when they first arose?

(1) *William I.* claimed the English throne on account of a promise made him by Edward the Confessor, and repeated by Harold, who himself, however, laid first claim to the crown upon the death of the English king. A conflict arose between these rivals, and William, after the battle of Hastings and defeat of Harold, received the allegiance of many English nobles, and after a series of conflicts extending over ten years acquired by right of conquest.

(2) *James I.* was the nearest heir to the throne vacated by the death of Elizabeth. His family were excluded by the will of Henry VIII., and confirmed by Act of Parliament; so many national advantages seemed likely to arise from his accession that when he entered England for the purpose of asserting his claim he was received with loyalty by the people.

(3) *William III.* was nephew of James II. and husband of Mary, the eldest daughter of James II. Although not the rightful heir his claim was promoted by the most powerful of the English nobles during the reign of James, and upon the Prince of Orange landing at Tor Bay, 1688, and marching towards London, James retired. William, after signing the 'Declaration of Rights,' was then declared king.

(4) *George I.*'s claim rested upon the Act of Settlement (1689) by which all the descendants of Charles I. were excluded from the throne, and the crown was settled upon the Princess Sophia of Hanover and her heirs, being Protestants. George I. was her son.

(5) *Whig* and *Tory.* During the reign of Charles II. the king frequently ruled without the assembling of a Parliament. In 1680 the country party, who were anxious for the assembling of Parliament, resolved to present petitions to the king urging him to summon it; grand juries and town corporations also forwarded similar petitions. The party who thus addressed the monarch were termed *petitioners*; a counter move in favour of the court arose and addresses were forwarded by the court party expressing abhorrence of the petitions and full confidence in the government. This party received the title of *abhorrers.* Hence the two factions became known by the names of *petitioners* and *abhorrers*, terms which were afterwards superseded by *Whig* and *Tory.*

6. Under what circumstances did the following places fall into English hands:—Calais, Dunkirk, Jamaica, Gibraltar, Minorca?

(1) *Calais* was besieged by Edward III. for a year, and was finally starved into surrender, and received the royal clemency by the submission of six burgesses, who were pardoned at the prayer of Edward's queen, 1347.

(2) *Dunkirk* was captured from the Spanish Netherlands by the allied forces of France and England, 1658, and ceded by Louis to the English.

(3) *Jamaica* was taken from the Spaniards during the above war by a force sent out by Cromwell under the command of admirals Penn and Venables.

(4) *Gibraltar* was seized by an English Admiral named Sir George Rooke during the wars of the reign of Queen Anne. It had been previously considered impregnable, but had been allowed to fall into a dilapidated condition by the Spaniards. It has been held by the English ever since.

(5) *Minorca* was ceded to England by the Treaty of Utrecht.

7. What was Henry VII.'s claim to the throne? How had the Wars of the Roses tended to strengthen monarchy? What discoveries at home and abroad led to his reign being regarded as the beginning of modern English history?

(1) *Henry VII.* based his title to the English crown on the following four grounds:—

(*a*) His intended marriage with Elizabeth of York.
(*b*) His descent from the house of Lancaster.
(*c*) His right of conquest.
(*d*) His present possession.

(2) The *Wars of the Roses* tended to strengthen the monarchy because as soon as the succession to the crown was settled the rival factions by whose blood the contest had been maintained found themselves in a terribly weakened condition. Freedom in the past had been won by the sword of the baronage, and had been watched over by the jealousy of the church. With the close, however, of the war, the barons found themselves enfeebled and the church weakened. The English monarchy up to the battle of Towton was limited by the force of feudalism and the progress of freedom. After that battle feudalism and freedom relapsed and the monarch became almost absolute.

(3) The *discoveries* at home and abroad of greatest importance at this time were:—

(1) The art of printing and the consequent rapid expansion of knowledge, especially amongst the middle classes.
(2) The Copernican theory of the universe.
(3) The discovery of foreign lands (especially the New World), and the passage to India round the south of Africa.
(4) The use of gunpowder, which entirely revolutionised the forces of war.

8. Explain the grounds upon which the following persons were put to death:—*Sir Thomas More, Lady Jane Grey, Somerset, Mary Queen of Scots.*

(1) *Sir Thomas More* was executed because of his opposition to the Act of Supremacy and the Act of Succession.

(2) *Lady Jane Grey* was the rival of Queen Mary to the English throne. She had indeed acceded to the throne but was speedily displaced by Mary. An unsuccessful revolt, in which her father the Duke of Suffolk took an important part, was the immediate cause of her being executed, 1554.

(3) *Somerset and Warwick* were rival noblemen during the reign of Edward VI., the former became 'protector,' when Warwick organized a successful opposition and himself became the chief of the Government. Upon Somerset taking steps to regain his position he was charged with treason and executed, 1552.

(4) *Mary Queen of Scots* became a prisoner in the hands of Queen Elizabeth. Frequent attempts at her release and Catholic combinations for her restoration and finally a conspiracy against the life of Elizabeth, in which Mary was stated to be an accomplice, combined to bring about her execution in 1587.

9. What were the following:—*Dissolution of the Monasteries, The Six Acts, Pilgrimage of Grace, Acts of Supremacy and Uniformity?*

(1) *Dissolution of the Monasteries.* After the fall of Wolsey his successor Thomas Cromwell issued a commission for the general visitation of monasteries, 'which led to the suppression by act of parliament (1536) of all whose revenues were less than £200 per annum, and their estates were vested in the crown.'

(2) *The Six Articles,* sometimes called the 'Bloody Statute' was passed in 1539, and declared—(*a*) That the real body of Christ is present in the Lord's Supper. (*b*) That communion in one kind only is necessary. (*c*) Priests may not marry. (*d*) Vows of chastity are to be kept. (*e*) Private masses are to be retained. (*f*) Auricular confession is necessary.

(3) *Pilgrimage of Grace.* This followed the suppression of the monasteries. The peasants were deprived of the alms and support the convents had afforded in times of want, and in consequence serious risings took place, especially in Lincolnshire and Yorkshire. The latter rising was called the Pilgrimage of Grace.

(4) *The Act of Supremacy* was a measure introduced by Thomas Cromwell for the complete subjugation of the church to the crown. It ordered that the king be head of the church; that the 'courts spiritual' become as thoroughly the king's courts as the temporal courts at Westminster; that Convocation could only deliberate by the royal licence.

(5) *The Act of Uniformity,* 1662, required every minister to declare his assent and consent to all contained in the Book of Common Prayer, or be deprived of his benefice.

10. Name two great navigators, two great writers, and two great statesmen of Elizabeth's reign, and say what they did. State the causes of the war between England and Spain.

(1) NAVIGATORS: (*a*) *Francis Drake* in 1577 set out on a voyage in quest of fortune, and after filling his vessel with spoils taken from the Spanish settlements in the Pacific, he returned home, having gained for himself the distinction of being the first Englishman who had circumnavigated the globe. (*b*) *Sir W. Raleigh* in one of his expeditions discovered a portion of the great American continent. To this he gave the name of Virginia. The following year the Colonists returned. Another attempt was made by Raleigh to found an American settlement in 1587.

(2) WRITERS: (*a*) *Shakespeare,* the first of English dramatists, who wrote during this reign the 'Merchant of Venice,' 'Romeo and Juliet,' and 'Othello.' (*b*) *Bacon,* whose 'Essays' 'are first in time and first in excellence of English writings on moral prudence.'

(3) STATESMEN: (*a*) *Burleigh,* who became Elizabeth's chief adviser upon her accession in 1588 until his death in 1598. *Sir Robert Cecil,* son of Burleigh, who succeeded his father. His authority was disturbed by court factions, which increased as the queen lost governing power.

(4) Elizabeth became the head of the new religion, which for some time had been spreading in Germany, the Netherlands, and especially in England. Philip was the champion of the old faith. His possessions were immense. For many years a direct conflict was avoided. Englishmen readily aided the enemies of Philip. Drake spoiled the Spanish possessions on the American main, and received commendation from his monarch. Leicester was sent with a small army to oppose the army of Philip in the Low Countries; finally, the execution of Mary Queen of Scots led the Old Catholics to look to Philip as their king. He determined to hurry forward the preparations for the English invasion by means of the Spanish Armada, 1588.

11. Who were the Brownists? Who were the principal leaders of the Puritan movement in England and Scotland? Why did Puritanism grow weak during the latter part of Elizabeth's reign, and then strong under James I.?

The *Brownists* were a sect of independents or separatists who, during the reign of Queen Elizabeth, absented themselves from attendance at public worship and who looked upon the existence of a National church as contrary to scripture.

The chief Puritans were:—Milton, Cromwell, Bunyan, Pym, Hampden, Knox.

The church policy of Queen Elizabeth rested on the Act of Supremacy and of Uniformity, and whilst the main principles of the Reformation were accepted, the zeal of the ultra-reformers was held in check. After the removal of Mary Stuart the opinions of the reformers gained ground, but Elizabeth manifested no corresponding change. With the religious enthusiasm which was growing around her she had no sympathy whatever, furthermore the reform movement wasted its strength in theological controversies and persecutions.

With the accession of James the Catholic religion revived until the gunpowder plot caused a reaction. This, together with the king's paraded doctrine of Divine Right both of the monarch and the bishops, stimulated the puritans to united and determined action. Under the direction of men like Pym the puritan movement developed in a remarkable degree and the loose manners of the court served still more to strengthen the puritan faith in the minds of the people.

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Science Notes.

IN a paper contributed to 'Nature' for April the 5th, and signed H. E. A, attention is directed to the views of the President of the Chemical Society regarding the so called elements of matter. The President does not consider that the atoms of one substance are all of one absolute pattern, so that atomic weights are not constants, but mean values round which the actual weights of the individual atoms of a special kind range within certain limits. Thus if we could separate atom from atom we should find them varying in weight within very narrow limits on each side of the mean. This view is of course not in accordance with Dalton's Theory or with generally accepted opinions. The question of the atomic weights of elements is more than ever one of vital importance. Is it posssible that the atomic weights of all the elements can be expressed as multiples of the least of them? Are the elements really elementary? These are now questions of the deepest moment. In connection with these it would be most interesting to find out if cases of isomerism occur among the so called elements. Are nickel and cobalt isomeric. In the paper referred to, the author concludes by saying 'that so many converging lines of evidence now render it probable that the elements are compound that the discovery of isomeric elements would probably suffice to carry conviction to the minds of all who are open to argument on the question.'

⁂

MR. C. M. WOODFORD has recently spent several months in Treasury Island, one of the Soloman group. He succeeded in collecting no less than 17,000 specimens in natural history, which are found to comprise several new genera and many new species of mammals, birds, and reptiles. The vegetation is most luxuriant. The coast people are afraid to venture inland either from fear of the bush men or from superstition. The natives are cannibals. They are of the Papuan type though in the island of Ysabel there seems to be a strong infusion of Polynesian blood. The natives are intensely black in some of the islands and dark brown in the others. Their hair is woolly, but perhaps from the intermixture with Polynesians it is in other cases wavy or even straight.

⁂

THE whale fishery of Greenland last year proved to be a failure. The whales, it appears, are by no means all caught. Plenty of them are seen upon different occasions. They have however been followed too vigorously and have in consequence become excessively shy.

⁂

THOSE of our readers who are interested in recent geographical literature may consult the April number of the proceedings of the Royal Geographical Society. It contains the 2nd and 3rd of General Strachey's Cambridge Geographical Lectures. It also contains an excellent map of Siam.

⁂

THE subject of forestry has been much neglected in this country. At home trees have been cut down or planted as pleasure, profit, or caprice has directed. Those who have undertaken the duties of managing our vast forests abroad have had to seek their instruction where they could best find it. No provision existed for teaching it systematically at home. This defect has now been remedied by the opening of a forestry school at Cooper's Hill.

This is intended in the first instance for the instruction of a number of officers who will ultimately proceed to India to take charge of the forests there. But private students will not be precluded from joining the school provided they are willing to pursue the same course as the rest. There is a museum containing specimens of timber and implements used in forestry, as well as economic products of Indian plants. The Botanical Laboratory is furnished with apparatus for studying the physiology of plants, cultivating at constant temperature, measuring growth, estimating the water given off from transpiring leaves, and developing plants in water culture. A botanic garden is to be added at once. During the two years of study, visits are paid to Kew, and to the Forest of Dean, or the New Forest, and during the 2nd year they are taken to some of the important forests on the continent. All this it must be confessed is a step in the right direction, rendering us somewhat less dependent upon foreign help in the higher departments of an important industry. We move, though only slowly.

⁂

PUBLIC attention is likely to be directed to the Science and Art Department, South Kensington. Sir Henry Roscoe made some very strong remarks in the House of Commons upon the want of room and want of facilities for putting the Science teaching there upon a thoroughly satisfactory basis. There ought to be a ready response. It is greatly in the interest of the country that everything necessary for the thorough efficiency of these National Science Schools should be at once forthcoming.

The buildings should be suitable, the apparatus abundant and everything used by the students should be supplied without stint. We feel sure that if the matter is only put so that the constituencies can understand how vitally it concerns them, they will make it impossible for the funds to be withheld. It is a time for the friends of Science to come to the front, let them prepare their case and not make it so that a man can understand it if he tries, but so that he cannot misunderstand it if he tries. All they have to show is that the money voted year by year for the Science and Art Department goes, and has gone to promote the actual teaching of Science and Art and that the additional money asked for will be spent in furtherance of the same object. The country was never so earnest as it is now in regard to such subjects as drawing, science teaching, and manual instruction. It will be exceedingly difficult for a Chancellor of the Exchequer to stand in the way of any reasonable expenditure which has for its aim the better instruction of the people in these most important subjects.

⁂

OYSTERS it seems feed twice a day. It is only at such times that they open their shells. When taken out of their natural element they attempt to feed at regular intervals, and so soon as the shells open the liquor they contain is all lost, the air takes its place, and the oyster is covered with a thick coating of slime which is the first stage of decomposition. As long as the shells are closed it is said the oysters are fit to eat. It can feed for some time on the liquor in the shell. To secure the keeping of the shells closed a method has been invented in America of tying them with wire. This makes the oysters keep. They can then be despatched to almost any distance.

Query Column.

RULES.

1. **Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.**

2. **No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.**

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office ***not later than the 12th of the month***, or they cannot be attended to in the following issue.

⁂ All communications for this column should be addressed—'*The Query Editor*,' ***The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.***

Arithmetic.

ELEVE.—Find the present worth of £2,197 due in 3 years at 4 per cent. per annum, compound interest. (*Barnard Smith.*)

£
100
4
104
4·16
108·16
4·3264
112·4864 = Amount of £100 in 3 years at 4 per cent., compound interest.

∴ £112·4864 : £2,197 :: £100 : Present Worth.

1124864)2197000000(1,953£
1124864
10721360
10123776
5975840
5624320
3515200
3374592
140608
20
2812160(2s.
2249728
562432
12
6749184(6d.
6749184

∴ Present Worth = £1,953 2s. 6d. Ans.

General.

1. ST. BERNARD.—(1) At A you increase at *each* end of the Pin, till you have 80 stitches. If the back of the Crossover should seem too short, knit more rows at B.

(2) At H you decrease only once, *i.e.* at the beginning of the row. If you will look at the Diagram you will see that it is *straight* from the neck downwards.

2. HOPEFUL.—If you write to the Registrar of the London University he will send you the syllabus for matriculation. If you ask for it he will send you the course for a degree in arts also. The other degree is a little easier to get. At present, however, you are looking too far ahead. Study English. For your vocation that will be of much the most value. You say have you any hope; you mean any chance. Don't use brackets. Learn to read, write, and speak the English language with precision and taste. Then add the other subjects for the matriculation. The rest will come in due time.

3. TOMMY.—We quite agree with you. For 'Animal Physiology,' try Huxley. Magnetism, Electricity, Acoustics, &c., Deschanel's 'Natural Philosophy.' In Latin use Abbott's 'Via Latina' and Macmillan's 'Progressive French Course.'

4. PETIT.—Make the sentences shorter. Always read your compositions before leaving them. The fault of your essay is want of simplicity; eighty per cent.

5. LINCOLN.—The History is not sufficient. Get Justin Macarthy's short history of the present reign. Add Jevon's 'Primer,' 1s., and Marshall's 'Economics,' 2s. 6d., to Mrs. Fawcett's book. The School Management is particularly weak. You want Sully's 'Handbook of Psychology,' 6s. 6d., and Jevon's 'Logic,' 1s., in addition to what you have already.

6. COMUS.—Sylvanus Thompson's 'Lessons,' Macmillan & Co., 4s. 6d., and Tanner's 'Manual of Agriculture,' 4s. 6d.

7. MAXIMUM.—You will not have to give a lesson. We are not aware that the marks given at the scholarship are published. Hence we cannot help you: and you cannot get to know.

8. LEX.—We cannot afford the space. The meaning is quite plain. The village had changed. Instead of scattered hamlets there are huge buildings and stately mansions.

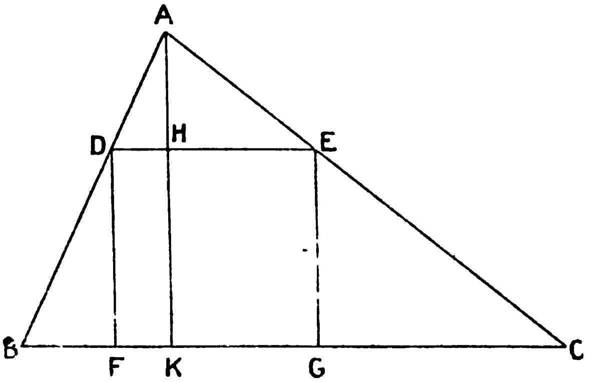
9. COLUMBIA.—We cannot help you at all, except negatively. They are not the same, and you would most likely have great difficulty in obtaining a permanent situation. If you go there you could, in all probability, get on exceedingly well, but it would have to be in business of some sort, not in teaching. The profession of teaching in America is a sorry one, if it can be said to exist at all.

10. HORATIUS.—
a—indefinite article, qualifying thousand.
thousand—a numeral adjective, used as a noun, nom. to may.
may—intr. verb, pres. tense, indic. mood, 3rd prs., plural num., agreeing with thousand.
be—infinitive mood of the verb, gov. by may.
stopped—past participle, forming, with the verb 'be' the infinitive mood of the passive voice of the verb stop.
well—adverb, qualifying the verb 'be stopped.'
by—preposition, connecting three with stopped.
three—numeral adjective, used as a noun, and gov. by 'by.'

11. INSTOW.—No. Is that all you know about it? If you give particulars we may be able to help you. Order it through a bookseller if it is modern. It will not cost much.

Mensuration.

1. W. F. BLAY.—A square is described with two angular points on the side BC of a triangle ABC, and the other angular points on the sides CA and AB respectively. If a denote side BC, p the perpendicular from A to BC, and x the side of the square, show that $\frac{1}{x} = \frac{1}{a} + \frac{1}{p}$. (*Science Examination*, 1878.)



Area of triangle ABC = area of square DFGE + area of triangle ADE + area of triangle DBF + area of triangle EGC,

$$\therefore \tfrac{1}{2}(\text{BC} \times \text{AK}) = \text{FG}^2 + \tfrac{1}{2}(\text{DE} \times \text{AH}) + \tfrac{1}{2}(\text{BF} \times \text{DF}) + \tfrac{1}{2}(\text{GC} \times \text{EG}),$$

$$\begin{aligned} \tfrac{1}{2}ap &= x^2 + \tfrac{1}{2}x(p - x) + \tfrac{1}{2}(\text{BF} \times x) + \tfrac{1}{2}(\text{GC} \times x) \\ &= x^3 + \tfrac{1}{2}px - \tfrac{1}{2}x^3 + \tfrac{1}{2}x(\text{BF} + \text{GC}) \\ &= \tfrac{1}{2}x^2 + \tfrac{1}{2}px + \tfrac{1}{2}x(a - x) \\ &= \tfrac{1}{2}x^3 + \tfrac{1}{2}px + \tfrac{1}{2}ax - \tfrac{1}{2}x^2 \\ &= \tfrac{1}{2}px + \tfrac{1}{2}ax, \\ ap &= px + ax \\ &= (a + p)\,x, \\ x &= \frac{ap}{a + p}, \\ \therefore \frac{1}{x} &= \frac{a + p}{ap} \\ &= \frac{a}{ap} + \frac{p}{ap} \\ &= \frac{1}{a} + \frac{1}{p}. \end{aligned}$$

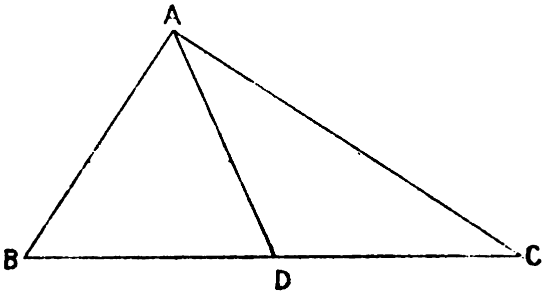
2. W. H.—Given the area of a triangle, its base, and the line drawn from the vertex to bisect the base, how can the other parts of the triangle be calculated.

Area = 805,928 sq. ft.

Line from vertex to bisect base = 1000 ft.

Base = 2000 ft.

Calculate other sides of triangle. (*Stage III.*, 1881.)



Let ABC represent the triangle, and AD the line (which is equal to half the base) drawn from the vertex bisecting the base.

$$\left.\begin{aligned} \text{DA} = \text{DC}, \therefore \angle\text{DAC} = \angle\text{DCA} \\ \text{DA} = \text{DB}, \therefore \angle\text{DAB} = \angle\text{DBA} \end{aligned}\right\} \quad (\text{I. } 5.)$$

$\therefore \angle$ BAC = $\angle$s ABC, ACB,

Wherefore, $\angle$ BAC is a right angle. (I. 32.)

Or, a circle can be described about the triangle ABC, of which BC would be the diameter.

$\therefore \angle$ BAC is a right angle. (III. 31.)

Let AB = a, and AC = b.

$$\text{Then, } \left.\begin{aligned} (1)\quad a^2 + b^2 &= 2{,}000^2 \\ (2)\quad \tfrac{1}{2}ab &= 805{,}928 \end{aligned}\right\}$$

$$\left.\begin{aligned} (1)\quad a^2 + b^2 &= 4{,}000{,}000 \\ (2)\quad 2ab &= 3{,}223{,}712 \end{aligned}\right\}$$

$$\left.\begin{aligned} \text{Adding]}\quad a^2 + 2ab + b^2 &= 7{,}223{,}712 \\ \text{Subtracting]}\quad a^2 - 2ab + b^2 &= 776{,}288 \end{aligned}\right\}$$

$$\left.\begin{aligned} \therefore a + b &= \sqrt{7{,}223{,}712} \\ a - b &= \sqrt{776{,}288} \end{aligned}\right\}$$

7'22'37'12(2,687·69
4
46 | 322
| 276
528 | 4637
| 4224
5367 | 41312
| 37569
53746 | 374300
| 322476
537529 | 5182400
| 4837761
344639

77'62'88(881·07
64
168 | 1362
| 1344
1761 | 1888
| 1761
176207 | 1270000
| 1233449
36551

$$\left.\begin{aligned} \therefore a + b &= 2{,}687{\cdot}69\ldots \\ a - b &= 881{\cdot}07\ldots \end{aligned}\right\}$$

$$\left.\begin{aligned} \text{Adding]}\quad 2a &= 3{,}568{\cdot}76\ldots \\ \text{Subtracting]}\quad 2b &= 1{,}806{\cdot}62\ldots \end{aligned}\right\}$$

$$\left.\begin{aligned} \therefore a &= 1{,}784{\cdot}38\ldots \\ b &= 903{\cdot}31\ldots \end{aligned}\right\}$$

$\therefore$ Other sides = 903·31... ft. and 1,784·38... ft.

3. CYCLOPS.—If x and $\frac{1}{x}$ feet be lengths of the sides of a right angled triangle, for what value of x is the hypotenuse greatest, and what is the greatest length of the hypotenuse? (*Harrow School Entrance Scholarship*, 1888.)

If x be an integer, then $\frac{1}{x}$ will be a fraction, and it is evident that the greater the value of x the greater will be the hypotenuse, and the greatest length of the hypotenuse will be a little greater than x, until we reached the limiting point for the construction of the triangle.

Note.—The geometry question was not a fair one, if the paper was restricted to the first three books. Although the triangle can be described by II. 11, &c., the proof is the same as IV. 10.

Have you noticed that in the *proof* of IV. 10, no reference is made to any proposition in that book? That may be the reason why it was given.

Trigonometry.

1. W. J. H. P.—Establish the following formulæ for finding the third side of a triangle when two sides and included angle are given:—

$$(1) \qquad a = (b + c)\cos\theta;$$

$$(2) \qquad \sin\theta = \frac{2\sqrt{bc}}{b+c}\cos\tfrac{1}{2}\text{A}.$$

Apply them to determine the third side when given angle is 120°, and sides which include it are 3 and 5. (*Stage* 3, 1879.)

Let A, B, C represent the three angles of a triangle, and a, b, c the corresponding opposite sides, and let the sides b, c and the included angle A be given.

$$\begin{aligned}
\text{Then, } a^2 &= b^2 + c^2 - 2bc\cos\text{A} \\
&= b^2 + c^2 - 2bc\left(2\cos^2\frac{\text{A}}{2} - 1\right) \\
&= b^2 + c^2 - 4bc\cos^2\frac{\text{A}}{2} + 2bc \\
&= (b+c)^2 - 4bc\cos^2\frac{\text{A}}{2} \\
&= (b+c)^2\left[1 - \frac{4bc}{(b+c)^2}\cos^2\frac{\text{A}}{2}\right].
\end{aligned}$$

Now find an angle θ such that

$$\sin^2\theta = \frac{4bc}{(b+c)^2}\cos^2\frac{\text{A}}{2};$$

$$\begin{aligned}
\text{Thus, } a^2 &= (b+c)^2(1 - \sin^2\theta) \\
&= (b+c)^2\cos^2\theta \\
\therefore a &= (b+c)\cos\theta. \quad (1) \\
\text{And, } \sin^2\theta &= \frac{4bc}{(b+c)^2}\cos^2\frac{\text{A}}{2}, \\
\therefore \sin\theta &= \frac{2\sqrt{bc}}{b+c}\cos\tfrac{1}{2}\text{A}. \quad (2) \\
\text{Sin}^2\theta &= \frac{4bc}{(b+c)^2}\cos^2\frac{\text{A}}{2} \\
&= \frac{4\times3\times5}{(3+5)^2}\cos^2\frac{120^\circ}{2} \\
&= \frac{4\times15}{8^2}\cos^2 60^\circ \\
&= \tfrac{15}{16}\times(\tfrac{1}{2})^2 \\
&= \tfrac{15}{64}; \\
\text{Cos}^2\theta &= 1 - \sin^2\theta \\
&= 1 - \tfrac{15}{64} \\
&= \tfrac{49}{64} \\
\therefore \text{Cos}\,\theta &= \tfrac{7}{8}.
\end{aligned}$$

$$\begin{aligned}
\text{Wherefore, } a \text{ (third side)} &= (b+c)\cos\theta \\
&= (3+5)\times\tfrac{7}{8} \\
&= \underline{7}.\ \text{Ans.}
\end{aligned}$$

2. G. W. C.—The sides of a plane triangle are severally $a^2 + ab + b^2$, $2ab + b^2$, $a^2 - b^2$; find the greatest angle.

$$\begin{gathered}
a^2 - b^2 \text{ is positive,} \\
\therefore a^2 > b^2, \\
a > b, \\
\text{and } a \times a \text{ or } a^2 > ab. \\
a^2 + ab + b^2 = a^2 + (ab + b^2), \\
2ab + b^2 = ab + (ab + b^2); \\
\text{but } a^2 \text{ is greater than } ab, \\
\therefore a^2 + ab + b^2 > 2ab + b^2, \\
\text{and it is also greater than } a^2 - b^2; \\
\therefore \text{Greatest side} = a^2 + ab + b^2;
\end{gathered}$$

$\therefore$ Cos of greatest angle

$$\begin{aligned}
&= \frac{(2ab+b^2)^2 + (a^2-b^2)^2 - (a^2+ab+b^2)^2}{2(2ab+b^2)(a^2-b^2)} \\
&= \frac{4a^2b^2 + 4ab^3 + b^4 + a^4 - 2a^2b^2 + b^4}{2(2a^3b + a^2b^2 - 2ab^3 - b^4)} \\
&- \frac{a^4 + 2a^3b + 3a^2b^2 + 2ab^3 + b^4}{2(2a^3b + a^2b^2 - 2ab^3 - b^4)} \\
&= \frac{-2a^3b - a^2b^2 + 2ab^3 + b^4}{2(2a^3b + a^2b^2 - 2ab^3 - b^4)} \\
&= \frac{-(2a^3b + a^2b^2 - 2ab^3 - b^4)}{2(2a^3b + a^2b^2 - 2ab^3 - b^4)} \\
&= -\tfrac{1}{2};
\end{aligned}$$

$\therefore$ Greatest angle $= \underline{120^\circ}$. Ans.

3. G. GALLETLEY.—How would you calculate the several sides of a triangle having given the angles and the sum of the sides. The sum of sides = 1,000 ft., its angles are 31° 20′, 58° 40′, and 90°. Find the longest side to nearest foot. (*May Science Questions*, 1883.)

Let A, B, C represent the angles of a right angled triangle, of which C is the right angle, and let a, b, c represent the corresponding opposite sides.

$$\text{Then, } \left.\begin{aligned} a &= c\cos\text{B} \\ b &= c\cos\text{A} \end{aligned}\right\}$$

$$\begin{aligned}
a + b &= c(\cos\text{A} + \cos\text{B}); \\
\text{In the question, } a + b &= c(\cos 31^\circ 20' + \cos 58^\circ 40'), \\
\text{Also, } a + b &= 1000 \text{ ft.} - c; \\
\therefore 1{,}000 \text{ ft.} - c &= c(\cos 31^\circ 20' + \cos 58^\circ 40') \\
&= c(\cdot8541564 + \cdot5200161) \\
&= c \times 1\cdot3741725, \\
1{,}000 \text{ ft.} &= c \times 1\cdot3741725 + c \\
&= c \times 2\cdot3741725, \\
\therefore c &= 1{,}000 \text{ ft.} \div 2\cdot3741725 \\
&= 40 \text{ ft.} \div \cdot0949669 \\
&= \cdot0949669)40\cdot00000(421 \text{ ft.}
\end{aligned}$$

3798676
2013240
1899338
1139020
949669
189351

$\therefore$ Longest side $= \underline{421 \text{ ft.}}$ Ans.

Algebra.

1. C. H.—Show that $m(m-1)(m-3)(m-6)$ is divisible by 8, when m is an integer either positive or negative. (*Science Subject V.* 1881.)

If m be an even integer (positive or negative), then either m or $(m-6)$ is divisible by 4.

$\therefore m(m-6)$ is divisible by 8, when m is even.

If m be an odd integer (positive or negative), then $(m-1)$ and $(m-3)$ are positive, and one of them is divisible by 4.

$\therefore (m-1)(m-3)$ is divisible by 8, when m is odd.

$\therefore m(m-1)(m-3)(m-6)$ is divisible by 8, when m is an integer either positive or negative.

2. G. D. JONES.—£8,000 is borrowed for 50 years at 4 per cent. per annum.

Find the amount of the Annuity that will cover Principal and Interest in the given time.

Let A denote an annual payment in pounds, n the number of years, R the amount of one pound in one year, and P the amount of the loan in pounds.

$$\text{Then, } PR^n = \frac{R^n - 1}{R - 1} A ;$$

$$\therefore\ 8{,}000 \times (1{\cdot}04)^{50} = \frac{(1{\cdot}04)^{50} - 1}{1{\cdot}04 - 1} A,$$

$$\left\{ \begin{aligned} \text{Log } (1{\cdot}04)^{50} &= 50 \log 1{\cdot}04 \\ &= {\cdot}0170333393 \times 50 \\ &= {\cdot}851666965 \\ &= \log 7{\cdot}1066827. \end{aligned} \right.$$

$$8{,}000 \times 7{\cdot}1066827 = \frac{7{\cdot}1066827 - 1}{{\cdot}04} A,$$

$$56853{\cdot}4616 \times {\cdot}04 = 6{\cdot}1066827\, A,$$

$$\therefore\ A = 2274{\cdot}138464 \div 6{\cdot}1066827$$

$$\begin{array}{r} = 6{\cdot}1066827)2274{\cdot}138464(372\pounds \\ \underline{183200481} \\ 442133654 \\ \underline{427467789} \\ 146658650 \\ \underline{122133654} \\ 24524996 \\ \underline{20} \\ 490499920(8s. \\ \underline{488534616} \\ 1965304 \end{array}$$

$\therefore$ Annuity = £372 8s. Ans.

Note.—Consult *Todhunter's* 'Algebra for Colleges and Schools,' Macmillan and Co.; *Capel's* 'Tips in Algebra,' Joseph Hughes.

3. STANDSTILL.—A certain fraction, if 1 be added to its denominator, becomes $\frac{1}{2}$, and also becomes $\frac{1}{2}$ when 1 is taken from both numerator and denominator. Find the fraction. (*Blackie's* 'School Algebra.')

Let x = The numerator,

And „ y = „ denominator,

Then $\frac{x}{y}$ = „ fraction ;

$$\therefore \left. \begin{aligned} (1)\ \frac{x}{y+1} &= \tfrac{1}{2} \\ (2)\ \frac{x-1}{y-1} &= \tfrac{1}{2} \end{aligned} \right\}$$

$$(1)\ 2x = y + 1$$
$$y = 2x - 1.$$
$$(2)\ 2x - 2 = y - 1$$
$$y = 2x - 1.$$

As both the equations are the same the question is indeterminate, and any number of fractions can be obtained to satisfy the conditions.

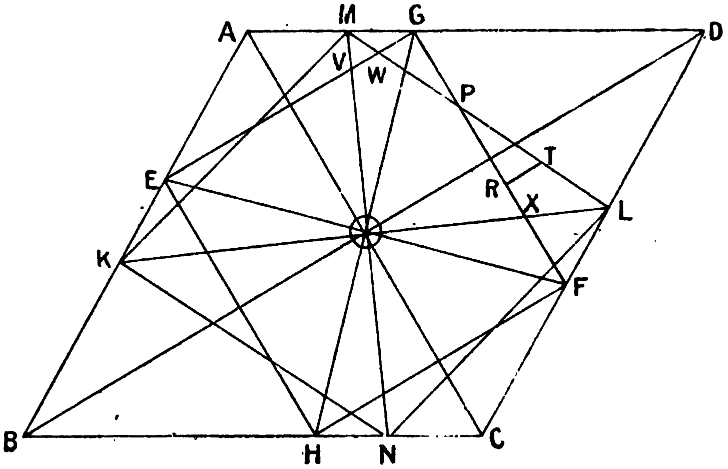
If $x = 2$, then $y = 3$;
$x = 3$, „ $y = 5$;
$x = 4$, „ $y = 7$; &c.

$\therefore$ Fraction = $\frac{2}{3}$, or $\frac{3}{5}$, or $\frac{4}{7}$, or $\frac{5}{9}$, or $\frac{6}{11}$, or $\frac{7}{13}$, or $\frac{8}{15}$, or $\frac{9}{17}$, &c.

Note.—The question is incomplete.

Geometry.

1. JOHN BULL.—Show that a square is the least possible rhombus that can be inscribed in a given rhombus.



Let ABCD be a rhombus.

Draw diagonals AC, BD.

Bisect angles AOB, AOD by EF, GH.

Join E, C, F, H.

Then EGFH shall be the square inscribed in the rhombus ABCD.

Draw any other line as KL through O, and draw MN perpendicular to KL through O.

Join K, M, L, N.

Then KMLN shall be a rhombus inscribed in the rhombus ABCD.

Then the square EGFH shall be less than the rhombus KMLN.

Proof.—Let GF, ML intersect in P, and from PF cut off PR = PG. (I. 3.)

Draw RT parallel to EG. (I. 31.)

Let OM, EG intersect in V; EG, ML in W; and OL, GF in X.

In triangles OVG, OXF,

∠ OGV = ∠ OFX, each being half a right angle,

∠ VOG = ∠ XOF, (Ax. 3.), as angles VOX, GOF are right angles, and angle GOX is common to both,

And side OG = side OF, being half diagonals of square ;

$\therefore$ Triangle OVG = triangle OXF : (I. 26.)

To each of these add triangle OGX,

Then quadrilateral OVGX = triangle OGF;

But triangle PGW = triangle PTR, (I. 26.)

$\therefore$ Polygon OVWTRX = triangle GOF ;

But triangle MOL is greater than this polygon ;

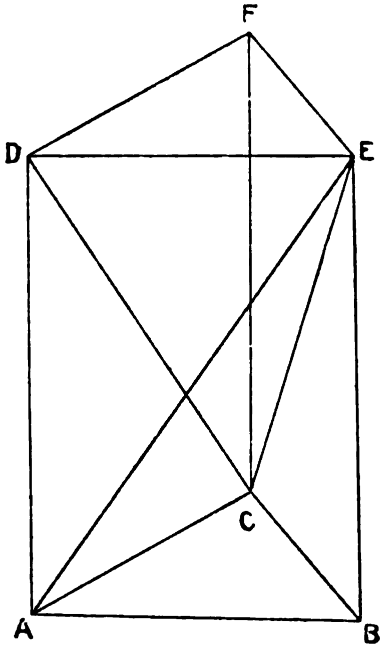
$\therefore$ Triangle MOL is greater than triangle GOF ;

Wherefore 4 times triangle MOL is greater than 4 times triangle GOF ;

$\therefore$ Square EGFH is less than rhombus KMLN.

Q. E. D.

2. KUMBRIAN.—Prove that 'The volume of a cone or a pyramid is $\frac{1}{3}$ of the volume of the cylinder or prism having the same base and altitude.'



Let ABCDEF be a prism; draw AE, DC, EC, and let planes pass through these lines two and two, thus dividing the prism into three triangular pyramids, whose bases are AEB, AED, and DFE, having the common vertex C.

Then each of these pyramids are equal to one another, and hence each of them shall be one-third of the prism.

Proof.—Since the face ABED is a parallelogram, the triangle ABE is equal to the triangle ADE, and hence the pyramid ABEC is equal to the pyramid ADEC, for triangular pyramids on equal bases and between the same parallel planes have equal volumes.

Since the triangle ABC is equal to the triangle DEF, and the planes are parallel, the pyramid ABCE on the base ACB and vertex E, is equal to the pyramid DEFC on the base DEF and vertex C.

Hence the three pyramids are all equal, and therefore each of them is equal to one-third of the prism of the same base ABC, and between the parallels, viz., the altitude or distance of the planes ABC, DEF.

What has been proved in reference to triangular pyramids and prisms is equally true whatever rectilinear figures constitute the base, for all prisms can be transformed to triangular ones, or divided into a series of triangular ones.

Note.—In a manner somewhat analogous, but also involving the principle that the circle is the limit of its circumscribing polygons made by successively doubling the number of its sides, the relative volumes of cones and cylinders are investigated.

Thus the following theorem is deduced :—

If a cone and a cylinder have equal bases and be between the same (or equidistant pairs of) parallel planes, the volume of the cone is one-third of the volume of the cylinder.

Q. E. D.

——o——

Pupil Teachers' Preparation Papers.

THE pupil teachers who have just sat at their annual examination will have well earned a short respite from daily routine lessons. By the time this number appears, however, they will again be turning to work. A few words will suffice to put them on the right track.

TO PUPIL TEACHERS BEGINNING A NEW YEAR'S WORK.

(1) Turn to Schedule IV. of the Code for the present year, and copy down in your pocket book the whole of the work required from you at your next examination. Keep this work steadily before your mind's eye, and do not rest satisfied till you feel that you have thoroughly mastered it. We do not by any means think that the Syllabus contains all that you should attempt during the year, but it does contain that which, considering what is before you, should be your chief care. If you thoroughly master your work now you will be better able to proceed to higher work at the training college or other place of study when your apprenticeship is ended. The want of a thorough grounding in the ordinary subjects is much complained of by both inspectors and tutors. Never let that be said of you.

(2) Divide the year's work in such a manner as to get through the whole of it in nine months. Write down the work for each month in all the schedule subjects. It may be that you will be able to do more than what you set down, as, for example, in music. If so, so much the better; you will then have more time for other work.

(3) Make out a time table for each day's work, and then firmly adhere to it. Do not forget to find a place in it for general reading and for exercise. The latter is especially necessary if you live near the school. Unless your body is kept in robust health you cannot have a healthy vigorous mind. You will find a time-table which works well and may suit you in the PRACTICAL TEACHER for June, 1887.

(4) Revise your work carefully and repeatedly—each month at all events, and in some subjects you may find it necessary to do so every week. Work the test papers which you will find in the April and subsequent numbers of the PRACTICAL TEACHER. If you are in any difficulty which you cannot solve in any other way write to the Query Editor of this magazine and he will answer your questions. *Well begun is half done.* Do not waste the first months of the year, but *begin now*, work steadily, regularly, and persistently, and you will do better in the coming than in any previous year.

TO OCTOBER CANDIDATES.

The advice to the April pupil teachers is applicable to you if you will substitute a half for a whole year's work. Holidays will intervene before your examination. Do not delay completing your year's work before these begin unless they fall in June, July, or the beginning of August. The working of the test papers in this magazine should not be omitted, even though they should appear in your vacation.

TO SCHOLARSHIP CANDIDATES.

Many of those pupil teachers who have just taken fourth year's papers, some who took them in former years and a few who have taken only third year's work will now look forward to the Queen's Scholarship Examination, which begins on Tuesday, July 2nd. If you have not obtained permission to sit, either at a training college or at one of the large town centres, do so without delay. You will have ten or eleven weeks for preparation.

It would be of little service giving you general directions for study *now*. We must content ourselves with asking you to carefully revise all the work in Schedule IV. of the Code, and in giving you a brief outline of what is required of Scholarship Candidates.

If you are to sit at a training college, you will be expected to be present on Monday. A medical examination must be satisfactorily passed, and in many colleges an examination in religious knowledge is also held. The Government examination commences on Tuesday. The order of the subjects is not given. The syllabus covers the whole of the pupil teacher course. In addition, papers are set in Latin, French, Greek and German, and any candidate may take one, but not more, of these. Unless you have had a year or more of hard work at the subject we should advise you not to attempt it. Marks are given for previous success in drawing, and one science. Some of the subjects of examination are known as *failing subjects*, reading, spelling, writing, arithmetic, grammar, and school management being among the number. If a certain per centage of marks is not obtained in these, there is no chance of success. There is, however, a much larger number of candidates than the colleges can accommodate, and unless you do fairly well in all subjects, you will not be able to gain admission. Make it your business, therefore, to do well in all subjects. At the examination itself the following hints, if observed, will be of great service to you:—

(*a*) Fill up the table at the head of your papers before even attempting to read them.

(*b*) Follow exactly every direction given on the paper itself.

(*c*) Read your questions carefully through, and answer those you can do best.

(*d*) Divide your time among the questions, leaving a quarter of an hour for revision, and keep well within the time you set apart for each.

(*e*) Do not attempt to anticipate a paper by trying to cram between the papers.

Some general directions as to the papers will also be of service.

Writing.—Write *on the lines* in a clear, bold hand, such as can be easily read. This will help you to marks all the way through the examination.

Composition.—On your scrap paper arrange the principal points of your theme in logical order just in the same way as you have seen done on the blackboard when teaching composition to the higher classes in your school. Write short sentences in such a way as not to become muddled with adjectival, participial or adverbial clauses. Attend carefully to your punctuation.

Grammar.—Closely allied with composition are the questions on grammar. They constitute together a *failing subject.*

The parsing and analysis are of most value. Try to understand the passage given for analysis, and then use common sense in addition to the ordinary grammatical rules you have learned, in working it out. In parsing, the chief point to be observed is the syntax. Never parse a word without showing its relationship to the other parts of the sentence. Practice tabular analysis in the following form, which is the one almost invariably required.

(*a*) Nature of sentence.

(*b*) (If subordinate) its relation to the principal sentence.

(*c*) Subject.

(*d*) Its enlargements (if any).

(*e*) Predicate.

(*f*) Its extensions (if any).

(*g*) Object.

(*h*) Its enlargements (if any).

In paraphrasing use simple language, giving the sense of the passage to be paraphrased in every particular, and taking care to maintain the spirit of the piece. Be sure you know correctly the definitions and use of the terms employed in grammar.

Arithmetic is another failing subject. Make plain readable figures. Show all working. Answer the questions you are sure you can do best. Questions which require definitions or reasons for processes carry most marks. If you attempt these be sure you understand the questions thoroughly before attacking them. There is always a choice of questions. Do what you are asked and *no more.*

Geography and History come together on one paper. *You must do the map,* and *you must answer the first question in History,* which asks for events and dates in chronological order. Maps are almost worthless without parallels and meridians. In history you must give dates. Do not make your answers too long. The map will take most time, say half an hour. Divide the other time, 2½ hours, into periods of a quarter of an hour. You will then have time for all the questions allowed and fifteen minutes for revision.

One paper is given to males only, viz., the paper on *Mathematics,* including Algebra, Euclid and Mensuration, while female candidates take *Domestic Economy and Needlework.* All material will be found for the latter, and the work to be done covers the whole of the pupil teacher's course as shown in the Code. Domestic Economy embraces questions on needlework, food, savings and investments, rules of health, clothing and washing. Follow exactly the instructions given on the paper.

In Mathematics male candidates will find thirteen or more questions. To each question in Euclid a rider or deduction is usually appended. If you can work the rider so much the better; if not, write out the proposition. If you take Mensuration, do not attempt the fifth and sixth questions in Euclid, these being set on the third book. In Algebra show all necessary working. In this as in every other paper divide your time, and leave some minutes for revision.

One other paper remains for both sexes, that on *School Management and Music.* In the former sixteen questions are usually given, and you must answer question *One,* and you may attempt eight others. Arrange your Notes of Lessons in three columns—Heads of Lesson, Matter, and Method, if the lesson admits easily of this division. Let your matter be sufficient, and your method logical. Mention illustrations and apparatus you would use. Choose the other questions you know most about. They will be similar to the questions on Teaching you have had during your apprenticeship.

In Music you must choose either the Old or the Tonic Sol-Fa Notation. You are not allowed to answer questions in both. If you attempt it your paper will be cancelled. You will have note, time and ear tests of about the same difficulty and the same kind as those given to the highest division in a school. Your best plan is to spend a few minutes each day in practising such tests before you attend the examination.

One more word: Keep in good health; do not neglect taking proper exercise; as the time draws near do not let the thought of the examination excite you if you can possibly help it; avoid putting things off to the last minute, and having done your best with a paper do not give way to despondency if you hear some one else say that they have done the work differently from you. Do not compare notes with anybody but wait till the final result is published.

(To be continued.)

Our Certificate Class.

BY DR. GEORGE BEACH.

Head Master of Christ Church School, Macclesfield.

NOTES ON SCHOOL MANAGEMENT.—*(Continued.)*

LAWS OF HEALTH.—N.B., Many of the Questions under this Head are set as Notes of Lessons.

A. Premises.—Our candidates should be prepared to answer questions on the *Site and Aspect* of the School—how to prevent damp walls—on *Draining* of surfaces, roofs, lavatories and nuisances, and the different systems requisite—on *Minimum Space* (superficial and cubical) required for each Scholar—on *Ventilation*, the best methods, so as to avoid draughts, so as to remove air vitiated by respiration or combustion, remedies for defective ventilation, Tobin's tubes—on best arrangements for *Warming*, giving the various advantages and defects—on the best methods of *Lighting*, best forms of windows and panes, best system of gas burners, and best colours for panes, blinds and walls—on *Arrangement of furniture*, as desks, etc.

B. Persons.—Questions have been set, upon the *Position and Posture* of Teachers and Scholars—upon *Forms of Recreations*, what games should be encouraged or discouraged, what period should be allowed for games, what physical exercises should be allowed in a School-room, what articles should be furnished for, and what their purport in a gymnasium—on *Personal Cleanliness* as regards body, attire and habits—on effects of the various *Punishments* upon health and on the physical aspect of *Home Lessons*.

C. Miscellaneous.—The examiners are inquisitive about—How far a teacher can influence the conditions of health—the height and form of seats and desks—the properties of air and water—the density of sewer gases compared with air—necessity for and best means of disinfecting—how thinking is affected by a vitiated atmosphere—and how fainting through heat, etc., should be treated.

NOTES OF LESSONS.—As already stated, this division overlaps more or less all its fellows, even intruding into the Arithmetic, Domestic Economy, Grammar, etc., Papers.

In short the student must be prepared to draw up 'Notes of Lessons' on any subject he may have to teach or may have to study. Moreover he may be asked to compile a 'Course of Lessons' upon a given subject. Any ordinary work upon 'School Management' furnishes sufficiently good specimen 'Notes,' and Mr. Cowham's 'Model Notes,' now appearing in the '*Practical Teacher*' will be of special value. The notes should not savour too much of 'bookish theorie,' nor be too abstract. Shew in them that you mean to introduce the concrete, and to teach through as many senses as possible, illustrating by models, pictures, maps, diagrams, drawings, etc., home made if need be. (The best 'Notes of Lessons' we ever saw was one upon 'Flavours,' in which by hearing, tasting, smelling, seeing and even touching, all the different senses were admirably appealed to and utilized.)

Don't cram too much matter into your 'Notes,' educe knowledge rather than impart it. Let the 'Notes,' consist of sections well articulated together. At the end of each Section, briefly recapitulate, at end of 'Notes,' summarise.

The Examiner also requires to know the principles employed in compiling the 'Notes,' and how a 'P.T.' should be instructed in this compilation.

Neither would it profit nor would it be possible, within our limits, to recapitulate all the questions given under this 'Head;' but we adduce numerous typical examples, 'Notes of Lessons' have been required on a glacier, the law of gravitation, volcanoes, climate, flowers, beasts of prey, water and air—on geometric forms, triangles and areas—on the Clyde, Severn, German Ocean, Egypt, and the meaning and use of a map—on the Normans, the Commonwealth, battle of Waterloo, and the House of Stuart—on multiplication, addition and division of Fractions, Inverse Proportion and Practice—on the classification of Pronouns, the formation of Abstract Nouns from Adjectives, the Adverb, the Passive Voice and the Infinitive Mood—on choice of food, electric lighting—how to secure fresh air, good drainage and healthy dwellings—on kitchen, wages, money, sugar, etc.—on the moral use of games, personal cleanliness, temperance, industry, truthfulness, obedience to parents, and kindness to animals.

'Courses of Lessons' upon Cookery, Mechanics, Physiology, Air and Water, have been asked for.

EDUCATIONAL WORK OF PESTALOZZI.—Our work here is facilitated by Canon Warburton's (to whom we really leave this branch) excellent articles now appearing in the '*Practical Teacher*,' but rendered more difficult through the comparative novelty of the Subject. However, the Examiner's way of dealing with Froebel will assuredly assist us with Pestalozzi.

The Student must become thoroughly acquainted with the life of Pestalozzi, his disposition, peculiarities, failures, experiments, his influence upon educational thought, the development of his ideas respecting the moral and intellectual nature of a child, and his methods of instruction and training.

GENERAL REMARKS ON SCHOOL MANAGEMENT.

The 'Sickly sentimentality' which objects to moderate and reasonable corporal punishment having affected Whitehall, will prevent the Examinee on some occasions giving the best answers to questions relating to the correction, prevention and punishment of certain grave misdemeanours. Our Department, unlike Carlyle, does not think the teacher's birch as honourable as the soldier's 'butchering tool.'

Take, for example, 'Cruelty to Animals.'

This offence may and indeed generally does proceed from mere thoughtlessness and not from wanton inhumanity. For thoughtlessness, a reprimand coupled with instruction, and accompanied by an appeal to the culprit's generosity, will generally suffice—for wanton cruelty a 'sound thrashing' is supremely the best. Parodying Shakespere 'As fire burns fire so cruelty, cruelty.' Corporal punishment which has among adults suppressed garotting and 'scotched' wife-beating will equally among juveniles repress manifestations of 'Cruelty to animals'—for cruelty and cowardice are inseparables.

Undoubted as this is, it might be unwise to avow it in your answers; but we leave it to the candidates' moral courage.

The example already adduced will well illustrate our second remark.

Vice has many roots as well as numerous ramifications. Therefore, in answering questions respecting punishments do not regard the manifestation (ramification) of vice, but the cause (root), and endeavour to eradicate it. This method will prevent us, both in answering questions and in the teacher's school legislation, awarding 'the same punishments for the same offences.' Bentham says, 'This adage has an appearance of justice and impartiaity which seduces the superficial observer. Nevertheless, too severe for one, too indulgent for another, always failing through excess or deficiency, it conceals an inequality the most monstrous.'

Since our last paper we notice that Mr. E. Stanford, 55, Charing-cross, S.W., will forward through any head teacher, and for threepence, a 'Composite Register,' especially prepared for the use of 'Candidates for Certificates,' and containing specimen pages of—I. The Admission; II. The Class; III. The Summary, and IV. The Half-Time Register.

ROUTINE FOR MAY. (MALES.)

DAY	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
MONDAY	Articles 1 to 22 of Circular 217 (page 91, Heller's Code). Page 128 Heller's Code	Revise all Euclid, Book I.	Paraphrase Lines 255—276, of Cæsar, Act III. Scene I.	Revise Deductions of Book II.	Paraphrase Comus, Lines 385—403	Manufactures of England	Explain the moral design of Comus, with especial reference to its last six lines	Map of England showing manufacturing towns and coal-fields	Tenth chapter of McCarthy	What are the ordinary Scholar's defects, and how should they be met?	Deductions. — First 55 in Egan, Part II.	Study the Syntax of Verbs
TUESDAY	Political Geography of Hindostan	(Fourth Root) $\sqrt[4]{}$, (Sixth Root) $\sqrt[6]{}$, $\sqrt[8]{}$, $\sqrt[9]{}$, $\sqrt[12]{}$, $\sqrt[16]{}$, etc., of Arithmetic	Outlines of English History, to end of Henry III.	Arithmetic. — Relations to each other of Interest, Discount and Present Worth	Eighth and Ninth chapters of McCarthy	Notes of Lesson on 'Short Division'	Study the Syntax of Nouns and Pronouns	Easy Problems involving Quadratics	The principal articles of Magna Charta	Revise Euclid, Book III.	Notes and Text of Comus to line 489	Position and posture of Teachers and Scholars, Forms of Recreation, etc. (See our analysis in this month's issue)
WEDNESDAY	Factors of Algebra	End of page 37 of Jevon's Logic Primer	Revise Deductions of Book I.	Problems involving Simple Equations	Euclid, Book III., to end of 13th Prop.	Write out the character of Cæsar	Deductions. — First 40 in Egan, Part II.	Paraphrase. (About p. 3 of Essay on Addison) 'A president duly elected . . . generally esteemed the wealthiest in Europe'	How climate affects industrial occupations	Physical Features of British South Africa	Mensuration of Pyramids, Rings, and Cones	Revise 'McCarthy'
THURSDAY	Write 30 lines of Composition upon 'Cowards die many times before their deaths'	Write a Large-Hand Copy of the word 'Parenthetically' and 30 lines of the Small-Hand Copy, 'The valley rings with mirth and joy'	Revise all Book II.	Political Geography of Hindostan	Compound Interest with its Algebraic Formulæ	Lives of Lanfranc, Anselm, Robert of Normandy, Becket, and Simon de Montfort	Stocks	Eleventh chapter of McCarthy	Simultaneous Simple Equations (Problems)	Notes and Text of Cæsar to end of Act III. Scene I.	Sums with A, B, C, working at different rates, or taps running with different capacities	Notes of a Lesson on 'The Adjective'
FRIDAY	Notes of Cæsar. to end of Act III. Scene I.	The Solar, Mean Solar, Sidereal Day, p. 101 of April issue	Revise all Mensuration of Plane Surfaces	Pure and Adfected Quadratics (Algebra)	Canon Warburton's Article in our April issue on Pestalozzi	Deductions. — First 16 in Egan, Part II.	Flora and fauna of the Temperate Zones	Euclid, all Book III.	Write a short life of Macaulay	Deductions. — First 70 in Egan, Part II.	Read carefully through half the Essay on Milton	Industrial occupations of Ireland

DAY	FIRST WEEK				SECOND WEEK				THIRD WEEK				FOURTH WEEK			
SATURDAY	Important Dates to end of Henry III.	Notes of Cæsar to end of Act III. Scene I.	Factors of Algebra	Drainage. (To end of p. 50 of Carpenter's Hygiene)	Notes of Comus to line 489	The Attendance Register. Revise Circular 217	Euclid, Book III., to end of 29th Prop.	Mensuration of Pyramids, Rings, and Cones	Manufactures and Minerals of Scotland	'Clock' Sums. 1. Position of hands. 2. Time indicated by a fast or slow clock.	Outlines of History to end of Edward II.	Simultaneous Quadratics	Revise Arithmetic	Important Dates to end of Henry III.	Simultaneous Quadratics	Write, *for future use*, a Summary of Canon Warburton's Article on Pestalozzi in our April issue

ROUTINE FOR MAY. (FEMALES.)

DAY	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
MONDAY	Articles 1 to 22 of Circular 217 (page 91, Heller's Code). Page 128, Heller's Code	Analyse, and Parse difficult words of, Lines 58—73, of Cæsar Act III. Scene I.	Manufactures of England	The Rebellions of 1715 and 1745	Interest	Physical Features of British South Africa	State fully the qualifications for a good sick nurse	To end of page 37 of Jevon's Logic Primer	Map of Cape Colony	Real rate per cent. obtained by investing in Stocks either at premium or discount	All Geography of British South Africa	Describe the character of Cæsar as depicted in the 'play'
TUESDAY	Walpole's Sinking Fund. Prevalence of Parliamentary Corruption during his Premiership	Exercises in Mental Arithmetic	Paraphrase Lines 71—90 of Cæsar Act II. Scene II.	Physical Map of British South Africa	A peasant, with wife and four children earns 15/- per week, how should this amount be 'laid out'?	Cut out and tack together the upper parts of half the front and half the back of a woman's night-gown (with yoke)	Drainage, Ventilation of, Drains, School 'Offices' (Carpenter pp. 28 to 51)	Relations to each other of Interest, Discount, and Present Worth	Physical and Political Geography of Cape Colony	Indian affairs during reign of George II.	Map out a year's course of weekly lessons on 'Cottage Cookery'	Learn the measurements, etc., of a child's muslin pinafore
WEDNESDAY	Show how 'natural sense' has anticipated scientific investigation in the choice of our ordinary food	Notes of a Lesson on 'Short Division'	Cut out and tack together half the front and half the back (with a sleeve) of a boy's shirt	Adoption of New Style, 1752. The Porteous Riots, 1736	Insurance and Percentages	Syntax of Verbs	Revise Geography of Scotland	Describe a few nourishing dishes that may easily be prepared by a Schoolmistress living alone	The Article on Pestalozzi in our April number	Revise notes of Cæsar	Describe on paper how a boy's shirt should be made	The Attendance Register. Revise Circular 217
THURSDAY	Revise Geography of Hindostan	Practise 'felling, gathering, stroking, and setting-in'	Proof of Rule for Mixed Decimal Repeaters. Relation of Vulgar to Decimal Fractions	Time allotted to Study, Examinations, Rewards and Punishments, Desks and Seats (Carpenter pp. 133—154)	Compare the advantages and disadvantages of the ordinary methods of cooking	Lives and works of Pope, Gray, and Garrick	Analyse, and Parse difficult words of, Lines 215—227 of Cæsar Act III. Scene I.	Conquest of Bengal and Life of Clive	Square Root of Vulgar Fractions and Decimals	Revise Geography of Ireland	Give a few general rules for the management of a sick room	Revise Discount
FRIDAY	Write out a Monthly Routine for the work of a House at 4/- per week (no servant)	Describe the theory of Proportion. Third Proportionals	History. — 'The South Sea Bubble' The second 'Triple' and 'Quadruple' Alliances	Paraphrase Lines 255—276 of Cæsar Act III. Scene I.	Practise 'running tucks and making button-holes'	Notes of a Lesson on the Adjective	Describe any good system of 'Penny Banks'	Write 30 lines of Composition upon 'Cowards die many times before their deaths'	Practise the different stitches on a piece of calico 9 inches square	'Vice has many roots.' How does this statement affect the theory of punishments?	Master the 'allusions' in first half of Addison	Outlines of History from 1739 to 1748

DAY	FIRST WEEK				SECOND WEEK				THIRD WEEK				FOURTH WEEK			
SATURDAY	The position of 'Cæsar' among Shakespere's writings.	Marriage Act of 1753. Rise of Methodism	Revise Geography of British North America	Large hand copy of the word 'Parenthetically.' Small hand copy of 'The valley rings with mirth and joy.'	Stocks. — Problems on difference of Income resulting from 'operations.'	Notes of Cæsar to end of Act III. Scene I.	Describe a few refreshing beverages suitable for sick persons	Practise 'whipping and sewing-on of frills'	Revise Arithmetic generally	Notes of Cæsar to end of Act III. Scene I.	Cut out on sectional paper and tack together half of the upper portion of a muslin pinafore	Outlines of History from 1714 to 1739	Syntax of Nouns and Pronouns	Revise any Geography already studied	Exercises in Stocks involving 'commission'	Draw up for future use a Summary of the article on Pestalozzi

PENMANSHIP.

The very full information afforded by School Management Manuals (see Gladman, pp. 59—71) and the examples contained in many excellent series of copy-books render more than a few words from us altogether unnecessary. Speaking now with some diffidence, we believe that the Graphic Copy Books are the best, they being the outcome of the experience of many 'Practical Teachers.' Procure Numbers 9, 10 and 11.

SMALLHAND.—All that the Department require is, that it shall be 'running, free, and symmetrical, as well as legible and clear.' The first two qualities simply signify 'ease of execution,' and the latter three 'legibility.' What is known as the 'Civil Service hand' is of course to be recommended.

Exercises set by Department:

'The valley rings with mirth and joy.'
'The castled crags of Drachenfels.'
'The warrior took that banner proud.'
'I see before me the gladiator lie.'
'Beware the pine-tree's withered branch.'

LARGEHAND.—The Department say that 'Large-hand in the Code may be taken as a general rule to mean writing in which the lines [between which it is written] are not less than three-eighths of an inch apart ; but providing the writing is bold and legible, and the proper forms and proportions of the letters are duly [observed], my Lords do not desire to prescribe a uniform rule, either as to its exact style or size.'

'Candidates are also not *to paint* their letters in the Copy-setting Exercise, but to take care that the copy is clean and without erasures.'

Exercises set by Department:

'Baron von Hardenberg.'
'Parenthetically.'
'William the Conqueror.'
'Imperial System.'
'Royal Prerogative.'

In both 'hands' err rather towards the maximum than the minimum of sizes. 'Writing,' say my Lords, 'as taught in schools is apt to be too small and indistinct. Pupils should be taught to write a firm, round, legible hand.' Blackboard practice is an excellent means of producing the requisite boldness and legibility.

Female Candidates are recommended not to indulge in any effeminacy of style, but to assimilate their writing as much as possible to that of the 'more worthy gender.'

ANSWERS TO CORRESPONDENTS.

We shall be pleased to reply briefly, and through this column, to any seeking information or advice.

STORNOWAY, MORPETH, BIRMINGHAM, ADWALTON (near Bradford), answered per ordinary letter.

A-MATHEMATIKOS.—You must endeavour to become *Eumathematikos.* Proficiency in the 'Classics' will by no means compensate for a considerable deficiency in Mathematics.

SALOPIAN.—The manuals you possess will be useful for Mathematics, School-management, History, and the English authors. The list of books given in our March article will show you what supplementary ones are required. We know of no royal road to Mensuration ; but your taste for Mathematics should render it palatable, if you will (where possible) *prove the rules.*

ANXIOUS.—We are sorry to think it impossible for you to be ready for the next Certificate Exam. Your spelling needs much attention.

(To be continued.)

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,

Ex-President of the N.U.E.T.

III.

As our previous papers, including the two model essays which they introduced, have been almost entirely taken up with hints on the writing of essays, we refrain from giving any additional hints of the kind in this paper.

Instead of further advice on writing essays, we offer this suggestion, which we trust our readers will endeavour to carry out. Take the essays already given, 'The Writing of Essays,' and 'Writing maketh an Exact Man,' and make an outline or summary of each. The same course may be adopted with regard to the essays, 'Hand-work and Head-work in Schools,' and the 'Influence of Example on Conduct,' which appear on pages 17 and 19 of the 'PRACTICAL TEACHER' for March last.

The student will remember what was said about the advisability of keeping the mere lines of structure of an essay out of sight. In other words, when the building is finished there should be as few traces as possible of the scaffolding by the aid of which it was built. Nevertheless an observant student will generally find it possible to analyse an essay and produce from it such an outline as might have been drawn up for the guidance of the original writer.

On the principle, generally a safe one in education, that analysis should precede synthesis, the reader will see that the practice of analysing essays is no waste of time, but will rather prove helpful in dealing with the same or other subjects. If the practice be adopted also with classical essays, such as those of Lord Bacon and Addison, it will serve the further very important purpose of increasing the student's familiarity with the writings of these authors and with their method of working.

An excellent exercise to follow this analysis would be to re-write the essay a week or two after, with no reference to anything more than the summary or outline. The same course may be pursued with our next model essay, which follows :

THE ADVANTAGES OF TRAVELLING.

Travelling has within the last few decades become so common, and is so often adopted as a holiday occupation, that it may be worth while to consider what benefits may fairly be expected to result from it.

One of the commonest reasons for which people enter upon a course of travelling is for the improvement of health. This advantage may be secured by simply changing from one's home in an unfavourable climate to places where the atmospheric influences are more congenial ; as, for example, from the bleakness of the Yorkshire moorlands to the soft and pleasing air of Devonshire and Cornwall, or from the enervating stagnation of a marshy district to the bracing air of the eastern coast of northern England, or the highlands of Scotland. But advantage is gained in the matter of health not merely from the change of climatic conditions, but from change of scene and the fresh interest of new environment. For a man to gain the full benefit of change he must be willing to cast aside for the time those burdens of care and thought which may have made the change of travelling desirable, and to abandon himself to the current of new scenes and associations. One of the strongest recommendations of travel as a means of recruiting health is, perhaps, the readiness with which this change of interest is effected. A season of rest spent in the scene of those activities by which health may have been impaired and strength exhausted is often haunted by those very anxieties from which it is necessary we should escape. In travelling, however, little or no effort is usually needed to wean ourselves from anxious thoughts about our work, for the constant succession of new objects of observation forces our thoughts into fresh channels. It is for such reasons as this that our great writers and thinkers, like Mr. Ruskin, Mr. Leslie Stephen, and Professor Tyndall, have been wont to spend their holidays among the snow-crowned Alps, and the varied interest of Italian cities.

This brings us to another advantage to be derived from travelling. By it our knowledge is greatly extended. The powers of observation are sharpened by being exercised on new fields. Facts in science and social life with which we have hitherto had no acquaintance come before us, and by their novelty print themselves on our minds with all the strength and vividness of first impressions. The sight of those marvellous monuments of mediæval skill and devotion, the cathedrals and abbeys of England and the Continent, deserving as many of them do to be called 'dreams in stone,' supply us with new and noble ideas. So also the varied landscape, the winding river, the towering mountain peak, the glassy lake, the 'changeless, ever-changing sea,' lift and enlarge the mind of every thinking beholder.

The scientific results of travel are altogether beyond enumeration. Who can measure how vastly our knowledge of the earth has been increased by the observations of the great voyagers and travellers from Columbus, his forerunners and contemporaries, down to the expeditions of the Beagle, the Challenger, the Vega, and the explorations of Speke, Baker, Livingstone, and Stanley in recent years? We need not dwell, however, on these great achievements of the great travellers alone. These add new wealth to the world's stock of knowledge; but the humble traveller who only goes on short journeys to neighbouring towns and villages may, by good use of his eyes, increase his own store of information. The teacher paying a holiday visit to some town or city may witness new modes of work, may learn in a practical way how some simple manufacture is conducted, may be enabled to realise by actual sight scenes and objects which have hitherto been vague and often erroneous imaginations. Having done this he may return to his duties able to lay more clearly before his pupils those facts in geography, history, and social life which have been illustrated to him in the course of his short travels. One counsel may be added for such as would gain the greatest possible advantage in the way of instruction from travelling and sight-seeing. It is this—look upon every new, beautiful, and interesting scene as if you were not going to see it again. You may hope to renew your acquaintance with it; but that should not lead you to look upon it slightly or with wavering attention.

In what has been already said about the healthful and instructive effects of travel another advantage has been very evident. In the case of many travellers the main purpose they have in travelling is to seek pleasure. It is, however, one of the characteristics of this kind of pleasure-seeking, that its object can hardly be fully secured without resulting also in those more substantial benefits of extended knowledge and improved health and spirits. The fact is, no doubt, that those who adopt travel as a means of seeking pleasure find their pleasure to a large extent in the exercise of their observing faculties, and in the accumulation of fresh information. They may certainly look forward to this further advantage, that in the new ideas and associations formed in the course of travelling they will store up the means of adding to the pleasures of memory and reflection in quiet times when the more active joys of travel may be out of the question.

There is a further moral benefit derivable from travel; namely, that acquaintance with the ways and characters of people in other places should tend to lessen self-conceit. Becoming practically convinced of the existence of good social arrangements other than those that prevail amongst ourselves, we may become less insular or provincial in our tastes and opinions, and be willing to recognise varieties of good, and to be frankly tolerant where we cannot altogether give our approval.

To sum up, travelling affords an important means of culture, both physical and mental. It brings health, pleasure, and knowledge to the individual, and extends scientific and social knowledge for the material and moral improvement of states. We should rejoice, therefore, that the improvements of engineering, by making travelling easy, cheap, and speedy, have put its benefits within the reach of others than those who, in the last century, could afford to complete their education by doing 'the grand tour.'

(*To be continued.*)

Publications Received.

Blackie and Son—
Stories and Essays.

Cassell and Co.—
The Laws of Every-day Life. By H. O. Arnold-Forster.

Curwen, J., and Son—
Cantata: Donald's Hamper. By A. T. Foxwell and C. H. Lewis.

Fisher Unwin, T.—
The Story of the Nations: The Goths. By H. Bradley.
Children's Services with Hymns and Songs. By the Rev. A. W. Oxford, M.A.

Heywood, John—
Brave Men of Old. By the Rev. R. Fisher, M.A.
Elementary Introduction to Chemical Theory. By H. Macair, M.A., F.C.S.

Houlston and Sons—
The 'Beautiful Valley' Series of Sermons to Children. No. 1. By the Rev. T. Bruster.

Jarrold and Sons—
The Teachers' Diary and Pocket Book, 1888.

Johnston, W. and A. K.—
Natural History Plates: Vampire Bat and Flying Fox; Giraffe; Peacocks; Butterflies and Moths.

Longmans and Co.—
Longmans' New Historical Readers. Standards 4, 5, 6 and 7.
Elementary Chemistry. By W. S. Furneaux.

Miscellaneous—
Education Insurance Scheme. By J. Fraser.

Nelson, T., and Sons—
The Queen Primer. Parts I. and II.; and Infant Reader.
The Royal Standard Readers. Standards I., II., and III.

Relfe Bros.—
Vocabulary to Le Philosophe sans le Savoir. By A. J. Skinner and R. Guérin Solbé.
Lesson-Pegs.

Sampson, Low and Co.—
The Three Principles of Book-keeping. By J. G. Chaplin.

Swan Sonnenschein and Co.—
Key to the Volapük Grammar. By A. Kirchhoff.

The Civil Service Book Depot—
Practical Spelling Book. By G. E. Skerry.
Practical Papers in Civil Service Geography. By G. E. Skerry.
The Civil Service Competitor. No. 136.

Trübner and Co.—
Memory and its Doctors. By Dr. E. Pick.

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music.

26. In mixing the Doh and the Soh chords in one exercise it will be necessary to notice what leaps are difficult. They may be classified as follows :—

DIFFICULT LEAPS.

From Doh chord to Soh chord.

$s\ r — s\ t_1 — m\ t_1 — m\ t — s_1\ r — d'\ r$

From Soh chord to Doh chord.

$d'\ t\ s — d\ r\ s — d\ t_1\ s$

27. Voluntaries at this stage should combine stepwise movement with two or three of the leaps quoted above. The difficulty of leaps is much lessened (*a*) when the tone to which the leap is to be made is strongly impressed on the ear by previous occurrence and (*b*) when the mental effect of the tone to which the leap is made has been apprehended. The following are specimens of suitable exercises.

Key C or D.

(1) **d s m s d** *m r r m* **s r r m s d m r s d**

(2) **d m d s d' s t d'** *s t t d' s* **s d' t s d' s d**

Key F or G.

(3) $d\ s_1\ d\ m\ d\ s_1\ t_1\ d\ m$ *$s_1\ t_1\ t_1\ d\ m$* $t_1\ t_1\ d$

(4) $d\ m\ d$ *$s_1\ t_1\ d$* $s\ t_1\ d\ m\ r\ d\ t_1\ d\ s_1\ t_1\ d$

When pupils can sing the leaps thus made less difficult the notes in italics should be omitted, and again the exercises can be sung backwards. The other leaps can be treated in a similar manner.

28. The mental effects of *te* and *ray* can be driven home in many ways. The keen expectancy of *te* may be illustrated by stopping abruptly upon it in such a connection as shown above—say on the 11th note of Example 2, and the gentler and more prayerful expectancy of *ray* by pausing upon the 11th note, Example 4.

29. Other and effective methods of practice that can be applied here and constantly in an elementary course may be briefly described as follows :—(1) The teacher undertakes to sing all the notes of an exercise *except* the *rays* (or *tes*, etc., etc.) the class singing what the teacher omits (2) the class is divided into sections and each section is made responsible for all the *dohs* or the *sohs*, etc., etc. (3) the teacher and the class sing alternate notes of exercises (4) the teacher sings **d m s m d** and asks the class for *ray*; he then sings **d m s m d** in some other key and asks for *ray*, and so on in still other keys.

30. The tones of the Third Step should now be introduced. It is unnecessary to describe with fulness methods of introduction and practice because the plans already familiar are sufficient for the purpose. Presuming that the mental effects of *fah* (desolate, grave, stern) and of *lah* (sad, sorrowful, weeping) have been duly demonstrated by the use say of such phrases as

$d\ m\ s\ m\ \overset{\frown}{d}\ \overset{\frown}{f}\ m$

$d\ m\ s\ \overset{\frown}{d'}\ \overset{\frown}{f}\ m$

$d\ m\ s\ \overset{\frown}{d'}\ d'\ \overset{\frown}{l}\ d'\ \overset{\frown}{l}\ d'\ t\ d'\ \overset{\frown}{l}$

and the hand signs have been taught, only the special difficulties of the step and the construction of progressive exercises call for consideration.

31. The difficult leaps in the *Fah* chord are **d' f — d l — f d** — $f\ l_1$. In mixing **f** or **l** with the tones of the other chords the following leaps are often found difficult, viz., **s l d' — d f s — d r f — s l m.**

32. Exercises similar to the following are suggested :—

Key D.

d s m d s *f m f m s* **d f m s d' f m r d**
d d' m s *f f m s* **d' f m d s d f s d**
d s m s *l l s* **d' l l s d l s t d' l l t d'**
s d *f m r* **f m d** *s* **l s d' s l d' d r f m**

Key F or G.

$d\ s_1\ d\ t_1\ d$ *$s_1\ l_1\ l_1\ s_1$* $d\ l_1\ t_1\ d\ d\ m\ s\ d\ l_1\ t_1\ d$
$d\ s\ m\ d$ *$s\ f\ m\ d$* $f\ f\ m\ d\ t_1\ d\ s_1\ t_1\ d$ *s_1* $l_1\ t_1\ d$
$d\ s\ f\ m\ d\ f\ m\ m\ d$ *$l_1\ t_1\ d$* $m\ s\ f\ l_1\ t_1\ d$

These exercises should be studied on the plan described in section 29. They form advanced exercises when sung backwards.

33. In constructing voluntaries the teacher must take care not to go from tone to tone of the Soh chord or of the Fah chord without occasionally allowing a characteristic note of another chord to be heard. The necessity for this care will be seen when it is remembered that the mental effects *and therefore the mnemonic power of the sol-fa syllables* of the special tones of the Soh and Fah chords (**r f l t**) depend entirely upon the unconscious comparison of the memory with a previously realised Doh chord. The tones of each of the three chords, considered separately, form precisely the same tune if they are made to start from the same pitch,

$r\quad s\quad d$
$t_1\quad m\quad l_1$
$s_1\quad d\quad f_1$

but when sung at contrasted pitches as in the common scale

—r^1
d^1 d^1
—t
l—
s s
f—
m
d

the special tones of the Fah and Soh chords acquire a special mental effect as long as the ear is able to contrast them with one another or with the tones of a remembered Doh chord. As the average ear cannot retain the impression of a key note or chord for any lengthened period it is found that the iterated tones of either a Soh or a Fah chord glide into the effect of a Doh chord and the sol-fa syllables naturally no longer exert mnemonic power. That this is true will be felt by singing the following :—

d s s t s s r r t s r t_1 r s t r s
d f l f d l_1 f d d^1 l f d l f

This matter has been entered into thus fully because want of knowledge of the leading principles of 'balance of key' leads to many vexatious mistakes. Besides helping a teacher to avoid the construction of difficult or impossible exercises the knowledge of these principles helps to explain failures in ear exercises, will dictate and control plans of ear training and will enable the student to see why the two common changes of key are smooth and easy.

34. From the foregoing the teacher will deduce the rule: In constructing tune exercises take care to mix stepwise movement with chordal leaps. The following may serve as specimen exercises :—

Key D.
d s m r d s l s f m s d f l s t d^1
Key C.
d r m s l s t r^1 d^1 s l t d^1 f m r d
m s d d^1 t d^1 s t r^1 s l t d^1 f l t d^1
Key F or G.
d s_1 m d s_1 t_1 r d m s_1 r d t_1 d r s_1 d
d r m d f_1 l_1 s_1 t_1 d m s s_1 l_1 s_1 t_1 d

These are not meant as exercises to be sung straight off. They are too difficult for first sight singing at this stage. They are intended as studies and should be practised as described in section 29, etc.

35. The code requires only stepwise use of *ray, fah, lah,* and *te,* that is, this use of these tones is the minimum sight singing standard looked for. But a good teacher should not confine his teaching to this narrow groove. If only with a view to the requirements of the next Division, at least the less difficult chordal leaps should be studied. It will still be desirable, however, to continually test pupils with exercises within the code. The following will serve as specimens :—

DIVISION II.

SPECIMEN CODE TESTS.

Key C or D.
(1) d s m r d r m s f m s l s d^1 t d^1 s l t d^1
(2) m r d s f m r m f s l s d d^1 m s d m r m d t_1 d
(3) d s l s m d r m s f m r m f m s l t d^1 s l s d r d
(4) s l s f m s d s t d^1 s m r m d r m s f m s t d^1 d
(5) d^1 s m s f m r d s l s d r d s l t d^1 m s d t_1 d
Key F or G.
(6) d s_1 m d t_1 d r m d s_1 l_1 s_1 d t_1 d r m s_1 l_1 t_1 d
(7) m s d r m s_1 l_1 s_1 d t_1 d s f m r d t_1 d r d s_1 s d
(8) s m d t_1 d r m d s_1 l_1 s_1 m r m s f m f m r d
(9) d m d s_1 l_1 s_1 d m f m r m d r m s f m r m d s_1 d

Key A or B♭.
(10) d s_1 m_1 f_1 s_1 l_1 s_1 t_1 d r d s_1 l_1 s_1 f_1 m_1 s_1 l_1 t_1 d
(11) d r m d m_1 f_1 s_1 d s_1 l_1 s_1 d m s_1 d t_1 d s_1 t_1 d
(12) m d r d t_1 d s_1 l_1 s_1 m d m_1 f_1 s_1 l_1 s_1 d t_1 d r d

36. The time requirements of the Code must now have consideration. Time tests are not applied to the Infants' Division. The first time requirement of the Code is that for Div. II. (Standards I. and II.), and is as follows :—

CODE REQUIREMENT.

DIVISION II.—STANDARDS I. AND II.

TIME TESTS.

To sing on one tone to the syllable *laa* an exercise including one-pulse and two-pulse tones, in two-pulse or four-pulse measure.

37. The first thing to establish is the idea of a pulse. A pulse is much the same to facts of time as a key tone is to facts of tune. Every note is a pulse, or more or less than a pulse in value. Every piece of music has its pulse. Pulses in any one tune are regular in period, and next they are distinguished by variety of stress. These are the great fundamental facts of time that should form the subject of repeated lessons until they are perfectly apprehended. It is futile to teach notation if the facts behind the notation are not clearly understood.

38. The idea of a pulse can be instilled by getting pupils to notice that regular taps (at the pulses) seem to fit a tune (sung by the teacher while tapping). To show how easy it is to find the pulse of a tune a class should be set to clap, march, or tap to a tune, or better, several tunes, each with a pulse rate different from the others. The fact that soldiers marching to a band, and people dancing to music, pick out the pulses with their feet will serve as an illustration that appeals to experience. Finally, the teacher will make clear to the class that each of the movements or taps of his baton stands for a pulse of a song or exercise.

39. The teacher in giving practice may first ask the class to sing after his pattern four notes to *laa* (on a monotone) each a pulse in value, then without pattern six notes, five notes, three notes, and so on, until the class can keep regular time with the baton.

40. The idea of accent should now be established. Tapping or singing alternately loudly and softly the teacher elicits a description of the difference. He may then point out that the words 'singing' and 'loudly' have a strong accent on the first syllable, and he gets the class to suggest many more words like these. If this exercise is thought too difficult for a young and not over bright class the teacher should pass on to get the class to sing by pattern a number of monotone *laas* alternately strong and weak, and when this is done without effort he should proceed to teach the notation of pulses.

(*To be continued.*)

Publications Reviewed.

The Laws of Every-Day Life. By H. O. Arnold-Forster. London: Cassell and Company, Limited.

The author of the 'Citizen Reader' has produced an admirable companion, or supplement, to that work in this series of lessons on 'The Laws of Every-day Life.' It deals in a very simple and attractive style with laws of reason and nature, and especially with such economic laws as have a restraining and regulating influence on the lives of men, either from their natural inherent force or from the fact of their being embodied in the law of the land. Thus the law of supply and demand is explained, and correct views on it are inculcated by means of remarkably well-chosen illustrations. Further on it is equally well shown how prices and wages are generally dependent on this law. A clear statement of the nature and uses of capital, and its relation to labour, introduces an account of co-operation for purposes of production and distribution, of trades unions and strikes, and the power of public opinion.

The illustrative examples are drawn from all sorts of sources; and by their striking character and appropriateness they serve not only to impress upon the readers the principles of natural and national law, but enliven the instruction with the interest that springs from variety. For instance, the need for law is illustrated by the story of the Mutiny of the Bounty and the Pitcairn Islanders, the lessons on supply and demand by the Black Hole of Calcutta, the Herring Harvest, the Siege of Gibraltar, and and the Cotton Famine. The story of John Hampden, of Henry of Navarre, of Mrs. Fry, and of Dr. Simpson, the discoverer of the surgical use of chloroform, are other samples of the many interesting illustrations which are aptly introduced into Mr. Arnold-Forster's book. The opinions expressed appear to be sound and well reasoned out, but near the end there is a rather strong statement of the moral wrong-doing involved in 'exclusive dealing.'

The volume is well-printed and suitably illustrated with wood-cuts. We can heartily recommend it as thoroughly well adapted for a reading-book in the higher classes in elementary and other schools.

Stories and Essays: a Series of Exercises in English Composition. London: Blackie and Son.

The first part of this little work consists of about two hundred and fifty short stories arranged in sets to illustrate different points of difficulty, as the 'Use of Inverted Commas,' the 'Hyphen in Compound Words,' the 'Apostrophe,' and so on. Many of the stories are very short, and a few are nothing more than the small witticisms which appear in the facetious paragraphs of some newspapers. Most of them, however, have the advantage of being pointed and interesting, and well adapted for composition exercises in Standard V., and, in the lower standards, where teachers are wise enough to begin the practice of composition at an earlier stage.

The second part occupies but a few pages, and contains some sensible suggestions on school essays, with copious lists of subjects and a small number of specimens.

Royal School Series: The Queen Primer, Parts I. and II. The Queen Infant Reader. London: T. Nelson and Sons.

The first part of the 'Queen Primer' teaches the very beginnings of the art of reading in the most methodical and pleasing manner. Easy words containing the short vowel sounds form the staple of the book; and most of the words which admit of it are illustrated by little pictures in white on black ground.

The second part of this primer follows the same method with the long sounds of the vowels. An attempt has been made, with considerable success, to infuse the interest of narrative into the simplest lessons. The last few pages are occupied with excellent lessons on words and numbers.

The 'Queen Infant Reader' contains simple narrative lessons, for the most part on animals, and a collection of those verses which charm every succeeding generation of children—our Nursery Rhymes. Many of the illustrations are in clear outline, and will tempt many little ones with a taste for drawing to imitate them. Several pages of spelling 'drill' are given, with monosyllables arranged carefully according to their vowel sounds.

We know of no reading books for infant schools marked by more attractive features, nor of any in which more care has been devoted to methodical arrangement as a means of facilitating instruction.

The Art of Speaking and Reading. By (Rev.) Harold Ford. London and Manchester: John Heywood.

This book is divided into two parts. The first and shorter portion includes ten brief chapters on Elocution, and the second, a selection of passages for practice. Many of these are taken from Shakespeare's plays, and many from poets and prose writers of the present century, with a few pages of Mr. Ford's own writing—the characters of Macbeth, Lady Macbeth, and Hamlet. The chapters on Elocution, form, however, the distinguishing part of the volume. They contain observations on breathing, articulation, and phrasing or word-grouping, likely to be useful to the reader, as well as exercises on vowels and consonants, and rules for inflection. The style in which the chapters are written is one which we cannot commend. It seems to be marked by an attempt at fine writing, and at the same time many of the sentences are very loosely constructed. We quote the following as examples:—'For how many a sermon is oftentimes paralysed, be its style never so picturesque or florid, its learning never so erudite or profound, either from an imperfect articulation, or lack of earnestness of expression, or from both. How much is oftentimes lost to us in the force and beauty of a discourse, be it never so logical in argument, so brilliant in conception, so vigorous in language, from a vicious and apathetic mode of delivery' (p. 7). A 'sermon paralysed' is a novel idea.

'Instantly that the process of replenishing the lungs has ceased, utterance should begin' (p. 10).

'It is not the intensity of a voice that constitutes a good delivery; for loudness, however great in degree, yet if (from want of a just appreciation and utterance of the elements of sound) it be mere confused *noise*, its range will be far less extensive than that of pure *musical* tone' (pp. 13—14).

The occurrence of such mistakes as 'elliminate,' 'euphonius,' and 'itonation' within the first few pages seems to betoken careless revision of the proof-sheets.

We have noticed these faults because a book intended to guide students to good habits of utterance and expression, should not set before them a weak, prolix, or turgid style of composition.

Prosperity or Pauperism. Edited by the Earl of Meath. London: Longmans, Green and Co.

This volume is one of special interest at the present time. The Earl of Meath (formerly Lord Brabazon) has collected all the recent important papers on the subjects of physical, industrial and technical training. It is often very difficult to lay one's hands upon the reports of speeches or the copies of pamphlets. Hence the convenience of a collection of these papers in one volume. We give the titles of a few of the thirty-two contributions of which the volume is made up: 'Manual Instruction,' by Sir John Lubbock; 'Manual Training in School Education,' by Sir Philip Magnus; 'The Organisation of Industrial Education,' by Professor Huxley: 'Technical and Trade Instruction,' a Speech by the Marquis of Hartington. The Earl of Meath, who has included several important papers of his own, says in the preface that many of our social evils would in a great measure be removed if an improvement were to be effected in our national system of education by the inclusion of physical, technical and industrial training. He hopes that the appearance of this book may assist in the formation of a public opinion which will insist upon important educational reforms. He would like to see the boys and girls start in life with stronger and healthier bodies, with a knowledge of things as well as books, with the power of using their hands as well as their heads, so as to make the most of their small resources. Anybody wishing to watch the growth of public opinion on this subject cannot do better than procure this volume, which gives all the most important papers yet published on the subject.

Geometry in Space. R. C. J. Nixon, M.A. Oxford: The Clarendon Press.

This is a sequel to 'Euclid Revised,' published some time ago, and now well known to students of Geometry. In this little volume of 100 pages the figures are of the highest excellence. The arrangement of the demonstrations, and the printing is exactly the same as in 'Euclid Revised.' The subjects treated are, Chapter I., Plane and Solid Angles (Euclid XI., 1—21); Chapter II., Polyhedra; Chapter III., Solids of Revolution. The author is not quite certain whether he will not enlarge the range and take in a few more subjects if they are wanted.

We venture with some diffidence to suggest to him whether it would not be well to treat the geometry of the sphere, cone and cylinder more fully. Students read what is prescribed, and if they have time or are enthusiastic more than that, but that they must read somewhere. The geometry of the cone, sphere, and cylinder is of considerable importance from the examination standpoint, and we think students would be grateful if more space were devoted to it. The sphere is especially important, as some acquaintance with it is useful in the elementary parts of astronomy. Mr. Nixon's last work will be welcomed wherever his former ones are known. It is excellent.

Elementary Chemistry—Inorganic and Organic. W. S. Furneaux. London: Longmans and Co.

This little work the author tells us has been written for young students who are preparing for the examinations in elementary chemistry on the lines of the new alternative syllabus, but being a brief and simple outline of the chemistry of common things it is hoped that it may be found useful to all who wish to acquire a knowledge of the elementary principles of chemistry, so far as concerns the common objects and phenomena of everyday life. The author further states that such simple instructions are given that even the self-taught student may find no difficulty in the performance of the experiments. The book is one of a handy and useful series now being issued by Messrs. Longmans, excellently bound and printed, and well illustrated. Such a book was wanted, and we have no hesitation in recommending it. It is on the whole well done, simple, clear, concise. It is not, however, in our opinion, quite all it might have been and should have been. The illustrations strike us as a little too elaborate. The question of illustrations is, of course, often one of expense. Be that as it may, all the experiments necessary to illustrate the subjects treated of in this book, and so far as they are dealt with in it, could have been performed with apparatus which would not have cost a tithe of the money required to buy what is here described. Take figure 13. A common balance which will carry 2 kilograms in each pan, and a 12 ounce flask and cork and a spirit lamp are all that is needed to show that air has weight. Very little more could be done with the expensive requirements mentioned on page 19. Experiment 56 is to show that steam is decomposed by being passed over red hot iron. The diagram is surely not intended as a representation of how the author would conduct the experiment; above all if he meant, as the text implies, to deduce from it the exact composition of water. Here we have apparently a large iron tube passing through an open fire, and are then told to suppose that it contained 42 *grains* of iron borings. An exact quantitative result is hardly possible without excellent apparatus, and an excellent qualitative one can be performed with a small piece of brass tubing and a long bunsen gas burner.

It is no doubt of the utmost importance that there should be plenty of experiments, and as many measurements as possible, but to ensure this in an elementary class for the people, the apparatus should be as simple and cheap as is compatible with efficiency.

There might also have been a little more precision in the nguage employed. Indeed, some of the statements are loose. On page 25 the flame is said to be extinguished as soon as the oxygen has been consumed. It is extinguished before it is all consumed. On page 48 we read 'Hydrogen cannot burn unless in contact with oxygen.' On page 85 there is a direction to pass a jet of burning hydrogen into a jar of chlorine. On page 49 hydrogen is said to be combustible, but not a supporter of the combustion of other substances, whereas oxygen will burn in hydrogen as well as hydrogen in oxygen. There is the too usual statement 'that the respiration of animals is exactly the opposite of that of plants, that plants absorb oxygen and give off carbonic acid gas during darkness,' as though a plant does not always absorb oxygen, and always give off carbonic acid gas. Every part of the plant, every living cell of it, without exception, needs oxygen. Plants placed in carbon dioxide are suffocated as truly as animals are. Every part of the plant absorbs oxygen and eliminates carbon dioxide; only in the sunlight the balance of exchange is in favour of oxygen from the green parts, since more oxygen is liberated from the decomposition of CO_2 than is absorbed, while in the dark all parts alike absorb oxygen and eliminate CO_2. We have perhaps done enough to show that caution is necessary in using the book. But notwithstanding such errors as we have specified, and some of them are perhaps more serious than they first seemed, the book is likely to be useful, and when it has been corrected we hope it may have a wide circulation.

Exercises for Translating German into English and English into German. Clemens Schlomka, M.A. Glasgow: Maclehose and Sons.

This German Reader consists of—1, short sentences; 2, short connected passages; 3, poetry.

The German characters are used from the beginning. At first the sentences are quite easy; but they increase in difficulty and variety. There are full vocabularies to the English parts, and a complete German vocabulary also. Hence the book can be used without a dictionary. It is well printed and attractively got up. It may be used in connection with any grammar for a threefold purpose—an easy reading book, a first composition book, and a list of pieces of poetry for recitation. It will answer the purpose for any of them very well indeed. For supplying material for class work it would serve admirably.

Geography for Schools:—Part I, Practical Geography. By Alfred Hughes, M.A. Oxford: The Clarendon Press.

The experience which the author of this most instructive little volume has gained as a master on the modern side at the Manchester Grammar School has stood him in good stead, and this literary embodiment of his labours ought to secure an appreciative welcome from all teachers of geography. It may be briefly described as dealing with the phenomena dependent on the rotation of the earth on its axis and its revolution round the sun, together with the chief points in mathematical geography; and although the book contains but six dozen pages it would be safe to assert that there are few teachers—even amongst those who consider themselves past masters in geographical science—who would not pick up some 'wrinkles' from its perusal. The explanations given are as a rule expressed with much clearness and force, and amongst those likely to prove of special value are the sections on the drawing of maps from the atlas and from memory, and the measurement of distances between places on the earth's surface. The problems appended to each chapter are well devised, and as most of them necessitate a reference to the atlas, a wider knowledge of ordinary topographical geography will be thereby insensibly acquired. The following questions which are taken at random from different parts of the book will serve to show the nature and scope of the information :—'Draw a map of that part of the earth's surface between 30° N. Lat. and 50° N. Lat. (page 8).' 'Find the distance from Hamburgh to Newcastle-on-Tyne (page 16).' 'A telegram from Manchester to Yokohama generally takes 2½ hours for transmission; if orders are telegraphed from Manchester at 5 P.M., and the answer received at 8 A.M. the next morning, what hours of the day will the agent in Yokohama have had for carrying out the business (page 23)?' 'On February 14 what places in the world do not see the sun at all (page 44)?' 'One of the old Norwegian writers, describing a land which one of his countrymen had discovered at a great distance S.W. of Iceland, relates that in this land the sun rose at half past seven and set at half past four on the shortest day; where must this land have been (page 65)?'

An appendix giving the weekly home-work papers actually set to the author's own classes during the Easter term of last year, forms an appropriate ending to a helpful little book, and affords a good example of what special and intelligent training can do with comparatively speaking junior forms.

Guide to the Scholarship Examination. By Benson Clough. London: George Gill and Sons.

Mr. Clough has in this volume very clearly shown all intending candidates the kind of Examination they may expect in July. Full particulars are given respecting the various training colleges. Some sixteen pages are next devoted to practical directions to students, and then follows a very full and complete analysis of all the questions in every subject given during the last ten years; solutions to some of the more difficult problems and translations of the passages given in the language papers are added. Very appropriately an examination paper in the form presented to the candidates closes the volume. The hints, counsels, and directions are those of a practical teacher, and one thoroughly well acquainted with what is necessary to ensure success. The book is well printed on good paper and, considering its practical value, is cheap.

Post Office Tots and Cross Tots. By Rev. Geo. Lithing and George Home. London: Educational Supply Association.

A series of tests in simple addition and compound addition is given to candidates for clerkships in various branches of the Civil Service. To secure a large amount of preparatory practice the publishers have issued a series of Tots (compound addition) and cross Tots (simple addition), the former being 96 in number, and the latter 16 of eighteen cross rows each. They are printed in bold type, and will serve their purpose admirably.

Selections from the Books of Ezra and Nehemiah. By Rev. H. M. Clifford, M.A. London: Henry Frowde.

This is one of a series of little handbooks on various parts of scripture prepared by Mr. Clifford for educational and home use. The text and annotations (which are very full) arranged in parallel columns, the preface and appended notes, references and tables, with the two specially prepared maps, all printed with the care exercised by the University printers, make up a text book admirably adapted for the study of the period forming the link between the Old and New Testament History.

Premier Table Book. London and Manchester: John Heywood.

The chief feature of this table-book is an extended multiplication table with money tables to correspond. Good drill in mental arithmetic to secure rapidity and accuracy may be obtained by its use. In addition to the ordinary imperial weights and measures, a large number of local weights are included. The moneys and rates of exchange of other countries are given. An error, which should be rectified, occurs in the case of Norway, where the coinage in use before 1875 is given instead of that now current.

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Technical Instruction in Elementary Schools.

BY SIR PHILIP MAGNUS.

IV.—MANUAL TRAINING—WOODWORK.

THE advantages of a further development of manual training than is possible through the teaching of drawing and modelling have been much canvassed of late years, but the prevailing opinion is decidedly favorable to the introduction of some kind of hand work in schools, by which boys may learn the use of ordinary tools, and may acquire some skill in the construction, in some easily workable material, of simple objects from properly executed drawings. It is to the French that we mainly owe the encouragement which has lately been given to the teaching of wood-work in schools. Although the system adopted in the well-known Communal School in the Rue Tournefort* has not been generally adopted in France, nor in other countries, the efforts of M. Salicis, the founder of the school, seconded by M. Laubier, the present head master, have been successful in directing attention to the importance, both from an educational and economical standpoint, of handicraft instruction; and already, in the year 1886, out of 174 primary schools, supported by the City of Paris, 95 were provided with workshops: 90 for instruction in carpentry and wood-turning, and 5 for metal work.

In these schools, the manual teaching has, hitherto, been given either before or after the ordinary school hours, but the Municipal Council of Paris attach such importance to this training that it is proposed to make the workshop instruction a part of the regular school curriculum. In the higher elementary schools of France the training is carried to a much more advanced stage. Belgium has followed France in recognizing the advantages of workshop training, and in the United States a public opinion in favor of manual training is being rapidly formed, which promises to exert an important influence upon the educational and industrial progress of the American people.†

It cannot be too often repeated that the object of workshop practice, as a part of general education, is not to teach a boy a trade, but to develop his faculties and to give him manual skill; that although the carpenter's tools may be employed as instruments of such training, its purpose is not to create carpenters. The absence of any good word to express all that is implied by manual instruction, as given by a competent teacher, is one of the causes of the lingering belief that the object of the instruction is to make tradesmen, who, it is justly said, can be much better trained in the shop. To dispel this illusion it is necessary to explain what are the objects and advantages of the instruction, and by what means they can best be realised. It would be some gain if the Swedish word 'Slöjd' could be employed to indicate the system of instruction. But, unfortunately, 'Slöjd,' which is a very good term, supposed to be connected with the English word 'sleight,' as used in the phrase 'sleight of hand,' implies a particular system of manual training which is, no doubt, well enough adapted to the industrial conditions of Sweden, but which differs in many respects from the system which, with such experience as we have already gained, can be recommended for adoption in this country. The term 'Slöjd,' however, might be accepted as a general name for workshop instruction, the object of which is not the teaching of any particular trade, whilst the method of the instruction might vary in different countries, or even in different parts of the same country, according to the views of the teacher or the wants of the pupils.

As a discipline supplementary to that of drawing and modelling, workshop instruction, by whatever name it may be called, is valuable as teaching a knowledge of *substance* in addition to that of *form*. Moreover, under competent instructors, it may be made an instrument of education similar in many respects to practical science. In the workshop, the operations to be performed are less delicate, the instruments are more easily understood, the substances employed are more ordinary; but the training is very similar, and in so far as the faculties exercised are those of observation rather than of inference, the training, educationally considered, is a fitting introduction to laboratory practice. At the same time the skill required in the workshop is particularly useful to the laboratory student in enabling him to make and fit apparatus and in giving him that adroitness on which progress in scientific work so much depends. Whilst manual training is valuable in the education of all persons—a fact which is already recognised by the headmasters of several of our secondary schools—the usefulness of this kind of training is much greater in the case of the children of the working classes, whose education is too limited and often too hurried to admit of any practical science teaching, such as older children obtain, and to whom the skill acquired is of real advantage in inducing in them an aptitude and taste for handicrafts, in facilitating the acquisition of a trade, and possibly in shortening the period of apprenticeship or of that preliminary training which in so many occupations takes the place of it.

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* For a full description of the work of this school, see 'Le Travail Manuel,' by D. Laubier & A. Bougerret, Paris, 1887.

† See the Monographs and other publications which are being now periodically issued by the 'Industrial Education Association,' New York (9, University Place), U.S.

An objection is sometimes raised to the introduction of manual training into elementary schools on the ground that as the children of the working classes necessarily leave school at an early age, and spend their lives for the most part in manual work, such time as they can give to study should be occupied in other pursuits—in cultivating a taste for reading and in the acquisition of book knowledge. This objection is due to a misconception of the true objects and aims of education, and to an imperfect knowledge of what is meant by workshop instruction. To assume that the best education can be given through the medium of books only, and cannot be equally well obtained from the study of things, is a survival of the Mediævalism against which nearly all modern educational authorities protest. But there is another and more deeply-rooted error in this argument. People often talk and write as if school time should be utilised for teaching those things which a child is not likely to care to learn in after life; whereas the real aim of school education should be to create a desire to continue in after life the pursuit of the knowledge and the skill acquired in school. In other words, the school should be made, as far as possible, a preparation for the whole work of life, and should naturally lead up to it. The endeavour of all educators should be to establish such a relation between school instruction and the occupations of life as to prevent any break of continuity in passing from one to the other. The methods by which we gain information and experience in the busy world should be identical with those adopted in schools.

But in order that the teaching may not degenerate into mere craft lessons, the methods of instruction must be carefully considered. That the training of the hand and eye, and the development of the mental faculties are the objects to be aimed at, should never be lost sight of. In many respects, the instruction should partake of the character of ordinary object lessons. Before the pupil commences to apply his tools to the material in hand, he should learn something of its nature and properties. The teacher should briefly explain the distinguishing characters of the different kinds of wood, as met with in the shop, and as found in nature, and also the differences in the structure and properties of wood, according to its treatment, etc. He should further illustrate his lessons by reference to specimens and examples, a collection of which should be found in every school workshop.

Something should be said of the countries from which timber is imported, and the conditions under which it is bought and sold; and in this way, the material to be manipulated should be made the centre of a series of scientific object-lessons. Concurrently with the practice in the use of any tool, the pupil should learn its construction, and the reason of its shape. The foot-rule, the saw, the plane, and the chisel, might each be made the subject of an object lesson to the pupils. In the same way, the teacher should explain the purposes of the different parts of constructive work, and should have models of tenon, mortice, dove-tailing, and other joints to illustrate his explanations. Fifteen or twenty minutes thus spent might be made the means of stimulating, and of exercising, the observing and reasoning faculties of the children, and of enabling them to fully understand the work they are doing and the instruments they are using.

Further, the children should be taught as soon as possible to work from correct scale drawings from their own rough sketches. However simple the object may be which the pupil is to construct, it should exactly correspond with his own drawings. In this way the workshop instruction supplements, and gives a meaning to, the drawing lesson, and the school teaching is made to have a direct bearing upon the subsequent work of the artisan. Dr. Woodward, the instructor of the St. Louis Manual Training School, who has had considerable experience in organising and superintending workshop instruction, tells us:—'The habit of working from drawings and to nice measurements gives to students confidence in themselves altogether new;' and he justly claims, 'That it is the birthright of every child to be taught the three methods of expression:— 1st, by the written, printed, or spoken word; 2nd, by the pencil and brush, using the various kinds of graphic art; 3rd, through the instrumentality of tools and materials which enable one to express thought in the concrete.'

Great use should be made of the black board in these lessons, and the pupil should be practiced in copying on paper, from drawings produced on the black board by the teacher, plans and sections of different kinds of joints, and of simple objects. The principle underlying such lessons is the combination of descriptive object lessons with geometry, drawing, and constructive work.

Both as regards the descriptive and practical instruction, a careful scheme of lessons should be prepared by the teacher, so that the pupils may be taken, step by step, from simpler to more important work.

The experiment of introducing work-shop instruction into public elementary schools is now being tried under very favourable conditions by the School Board for London, the funds having been supplied by the Drapers' Company, and the scheme of instruction elaborated by a joint committee of the School Board and the City and Guilds of London Institute. The syllabus approved by the committee is as follows:—

I.	II.	III.	IV.	V.
WOODS COMMONLY USED—	TOOLS—	PRACTICAL WORK (A).	PRACTICAL WORK (B).	PRACTICAL WORK (C).
(*a*) Conditions of Growth. (*b*) Felling and Seasoning of Timber. (*c*) Properties of Woods. (*d*) Heartwood, Sapwood, &c. Museum of prepared specimens of woods to be formed in each centre.	1. *Boys' Set.* (*a*) Description. (*b*) Manipulation. (*c*) Sharpening. 2. *'Centre' Set.* (*a, b, c*) As above, less of detail. 3. *Nails.* (*a*) Kinds. (*b*) Uses. 4. *2 ft. Rule.* To be specially treated.	Measuring and Sawing to line. Squaring piece of wood. Nailing and Screwing. *Construction of Simple Joints* (*a*) Exhibition of Model of Joint. (*b*) Explanation of Drawing of Joint. (*c*) Connection between Model and Drawing.	(*a*) Construction of Simple Joints according to Model and Drawing. (*b*) Construction of Simple Objects founded on Simple Joints.	(*a*) Glueing. (*b*) Hinging. (*c*) Knots—Tying, &c.

This scheme has not been sufficiently long in operation to enable any judgment to be passed on the results. But it would seem that it is on such lines as these that workshop instruction must be given, if it is to form a part of the ordinary curriculum of our elementary schools.

In organising a scheme of technical teaching in connection with our elementary schools, the difficulty has to be met of obtaining good teachers and competent inspectors. The artisan who is a skilful workman and nothing more may succeed in teaching the elements of carpentry and joinery; but he is not the kind of teacher needed. It is of the utmost importance that the teacher should be a good draughtsman, should have some knowledge of physical science, should be a fairly expert workman, and should have studied the art of teaching. To obtain at first such ideal instructors would be impossible; but there is no reason why gradually they should not be trained. Two processes suggest themselves. We might take a well-trained elementary teacher, having an aptitude for mechanical arts, and give him a course of instruction in the use of tools, either in a technical school or in an ordinary workshop. Or, we might take an intelligent artisan, who had studied science and drawing in some of the excellent evening classes which are now found in almost every town, and give him a short course of lessons on method in relation to workshop instruction. Good teachers might be obtained by either of these processes. But the former is certainly preferable for the simple reason that the instruction should be regarded as a part of the general education of the boy, not as a part of his apprenticeship. The trained teacher who has received a course of workshop instruction will undoubtedly be better able to make his lessons yield educational discipline than the tradesman who has had no pedagogic experience. On the other hand, the expert carpenter would be preferable if the object of the instruction were to teach the boy a trade. The great difference between the two instructors is—that the one has a deeper insight into the nature of the children, and the other a more thorough acquaintance with the practical details of the work in which they are engaged. Of course, a knowledge of the materials employed and sufficient manipulative skill are absolutely essential for the teacher of wood-work; but no less essential to the teacher of young children is a knowledge of the methods of instruction, founded on some acquaintance with the psychology of child-life.

At the Central Institution of the City Guilds, classes have been formed for the instruction of school teachers under the direction of the professor of engineering assisted by competent artisans; and in these classes the teachers have had the opportunity of acquiring, not only the manual skill necessary to enable them to command the respect of their pupils, but also a knowledge of the best methods of instruction, which those who have been previously trained are able, with great advantage, to apply in their practical lessons. If workshop instruction is to take a place in elementary education, it is desirable that the teachers should be trained school-masters. The ordinary mechanic, who will be found to be most serviceable as an assistant to the teacher, is generally unaccustomed to deal with very young children, is unacquainted with the graduated methods by which all sound instruction is imparted; and is too apt to treat his pupils like apprentices, who learn their trade by being shown 'how to do it' without understanding the reason why. It is an essential part of the Swedish System of 'Slöjd' teaching to place the workshop instruction under the direction of a trained schoolmaster. In other respects, particularly in neglecting to train the pupils to work at a very early stage in their progress from dimensioned drawings; in looking to the usefulness of the object to be made as an essential factor in the choice of exercises; and in strictly limiting the number of tools to be used by the child, the Swedish system should not, I think, be too closely followed, as not being sufficiently well adapted to the future wants of the children of this country.

In recommending the introduction of workshop instruction into elementary schools, it is necessary to note the probable cost of the tools and fittings. The cost is not so great as is sometimes supposed. An ordinary schoolroom, about 26 feet by 22 feet, will take five carpenter's benches, each about 14 feet long, by 2 feet 6 inches in width, and provided with six vices, affording places for 30 boys, the maximum number to be taught in one class. The benches should be well made, and fitted with every appliance for facilitating the pupil's progress, the object of the instruction being strictly educational, and the benches and tools being regarded as apparatus for instruction. The cost of the five benches would be about £25.

The room should contain a cabinet for holding tools for general purposes, and specimens of wood. Where several classes receive instruction in the same room, a set of tools should be appropriated to each group of boys who in turn occupy the same bench. This set of tools may be provided at the cost of 15s. Besides these tools, some few larger and more expensive tools are required for general use, the cost of which, for each centre, should not exceed £12.

In arranging the scheme of instruction, it will suffice to give each class of thirty boys one lesson a week, of two hours and a half or three hours' duration. The lessons, as previously explained, should consist partly of oral teaching on the growth and nature of woods and the use of tools, partly of drawing, and partly of practical work at the bench.

The shop thus fitted may be used in succession by different sets of boys, from neighbouring schools; but it is preferable that the class, in each case, should receive instruction from its own school-teacher. To employ one teacher continuously to instruct different sets of boys would prove, after a time, tiresome to the teacher, and the teacher himself would gradually lose that sympathy with his pupils' studies in other subjects, which it is essential to maintain, if workshop instruction is to become a part of the general education of the school children. On the other hand, it is an advantage that the artisan assistant should be permanently attached to the school workshop. With such arrangements the cost of the teaching appliances would fall lightly upon each school; for supposing the workshop to be used on only three whole and two half days in the week,* it would serve for eight sets, that is, for 240 pupils. The cost of the material would, of course, increase with the number of pupils; but as the work would consist more of exercises illustrating principles than of the construction of useful objects, the quantity of material consumed would not be large, and the cost of it should certainly not exceed 10s. a month for each class of 30 boys. Differences of opinion exist as to the age at which workshop instruction should commence; but if the teaching of drawing be continued throughout the standards, and be followed or accompanied by lessons in modelling, so that there be no break in the manual training of the child from the time he leaves the Kindergarten, I am inclined to think that, as a general rule, boys should have passed the fifth standard before commencing to use wood working tools.

Whilst advocating the general introduction of workshop teaching into elementary schools, I cannot lose sight of the fact that such instruction is likely to prove more serviceable to children of urban than of rural schools. In the latter it may be advantageous to partly substitute for the teaching of wood-work, some practical instruction in agriculture. But although a relation must always be maintained between the subjects of school teaching and the activities of life, necessitating elasticity and variety in any code of instruction, I cannot but think that practice in the use of wood-working tools is almost, if not quite, as serviceable to the children of an agricultural as of a town population. Indeed wood-work is selected as the subject of manual training because the exercise is in itself educational, and because some skill in the use of the tools employed is needed in nearly every trade and occupation. In a recent report of the Committee of Council on Education it is stated:—'After the three elementary subjects and sewing, no subject is of such importance for the class of girls who attend public elementary schools; and lessons in it, if properly given, will be found to be not only of practical use, but to have the effect of awakening the interest and intelligence of the children.' Surely what is true of sewing and cooking in the case of girls, is true to a greater extent of drawing and handicraft in the case of boys. The argument for teaching needlework to girls applies with almost equal force to the teaching of handicraft to boys. The object of teaching girls to sew is not to train professional dressmakers and milliners, but to make girls useful and *tidy* in their homes; and apart from the educational value of workshop instruction, one great advantage of it is that it makes boys generally *handy*. It does not make them carpenters or cabinet-makers, but it enables them to learn any trade more easily. The tools used in carpentry are wanted in many trades, and the boy who has acquired facility in the use of the plane, the saw, and the chisel will find it much easier to learn the use of any special tool he may subsequently need in the practice of his trade. But no small part of the value of workshop instruction is the skilfulness acquired which enables a man to make his home more commodious, to fit a shelf or cupboard, to repair a broken piece of furniture, or possibly to decorate his room. The comfort and cheerfulness of a poor man's home depend almost as much upon the husband's *handiness* as upon the wife's *neatness*.

Nor must we overlook the moral influence of this kind of training. Dr. Woodward, from whom I have above quoted, rightly says, 'It stimulates a love for intellectual honesty.' It teaches a boy to find out things for himself, to substitute personal experience for the statements of others: it creates moreover habits of industry and order. It forms a pleasing alternation to purely literary work, and enables a child to be constantly actually employed. It further teaches self-respect and a respect for the honest work of others. 'A boy who sees nothing in manual labour but mere brute force despises both the labour and the labourer.' 'With the acquision of skill in himself comes a pride in the possession and the ability and willingness to recognize it in his fellows.'

It is often said that all boys have not an aptitude for manual work. This is doubtless true, but it is equally true that every child has not an aptitude for spelling or reckoning. Nevertheless the three R's are taught to all children indifferently, and when we come to realise the importance of cultivating in children some amount of manual skill, workshop instruction will doubtless, also, find a place among the subjects of primary instruction.

Nearly all educationists have pointed out the many advantages of enabling children at an early age to realise the connection between *knowing* and *doing*. Comenius has well said: 'Let those things that have to be done be learnt by doing them.' Rousseau has pithily expressed a similar idea in saying, '*Souvenez-vous*

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* Time must be left for cleaning the classroom, removing shavings and arranging the work executed.

qu'en toute chose vos leçons doivent être plus en actions qu'en discours ; car les enfants oublient aisément ce qu'ils ont dit et ce qu'on leur a dit, mais non pas ce qu'ils ont fait et ce qu'on leur a fait.' Locke, speaking of the education of a gentleman—for in his day the education of the poorer classes was scarcely thought of—says: 'I would have him learn a trade, a manual trade;' and Emerson, in the choice words, 'Manual labour is the study of the external world,' tersely states the whole aim and purpose of my remarks. 'The introduction of manual work into our schools is important,' says Sir John Lubbock, 'not merely from the advantage which would result to health, not merely from the training of the hand as an instrument, but also from its effect on the mind itself.' Rabelais, Montaigne, Pestalozzi, Fröbel, Combe, Spencer, and others have urged the importance of practical teaching, of studying things before words, of proceeding from the concrete to the abstract. A very valuable and interesting report has recently been issued by a committee of the School Board for London, of which Mr. Bousfield was chairman, in which it is recommended 'that special manual instruction should be given under the following principles: (1) That manual work be always taken in connection with school teaching of underlying sciences and drawing; (2) That no special trade be taught.' The Report further states: 'Woodwork supplies the most convenient mode of giving manual instruction to elder boys. The material is cheap and easy of manipulation, and can be made illustrative of the intellectual work of the school.'

In what I have said I have endeavoured to show that workshop instruction may and should be made a part of elementary instruction; that, as an educational discipline, it serves to train the faculties of observation, to exercise the hand and eye in the estimation of form and size and the physical properties of common things; that the skill acquired is useful in every occupation of life, and is especially serviceable to those who are likely to become artisans, by inducing taste and aptitude for manual work, by tending to shorten the period of apprenticeship, by enabling the learner to apply to the practice of his trade the correct methods of inquiry which he has learnt at school, and by affording the necessary basis for higher technical education.

In this country we frequently complain that children leave school at too young an age, before they have had time to properly assimilate the knowledge they have acquired, with the result that they soon forget a great part of the little they have learnt. At the age of fifteen or sixteen, when they begin to feel the want of technical instruction, they are wholly unprepared to avail themselves of the opportunities for obtaining it now brought within their reach. A large part of what the nation spends on education is thus practically wasted. It is to remedy this state of things that continuation schools and recreative classes are much needed. But there can be little doubt, if elementary education were made more practical, that parents would be more willing, even at some sacrifice, to let their children benefit by it. They are often led to take their children away from school because they do not see much use in the 'schooling.' Of course the desire to secure the child's early earnings operates in very many cases; but I am convinced that it would be easier to persuade parents to forego these earnings if the school teaching had more direct reference to the work in which the children are likely to be subsequently engaged.

I have already shown that workshop instruction is of great value as an introduction and a help to the study of practical science. Of the importance of science teaching in elementary school instruction I shall speak in the next article.

(*To be continued.*)

Model Answers to Certificate Questions, Christmas, 1887.

Male and Female Candidates.

FIRST YEAR.

German.

Male Candidates may answer questions in *two* Languages; *Female* Candidates in *one* only.

TWO *hours allowed for this Paper for Male Candidates;* THREE *hours for Female Candidates.*

N.B.—German words must be written in English characters.

SECTION I.

Translate into English :—

(*a*) Das Feuer loderte nun recht luſtig im Walde, der Morgen war friſch, wir ſetzten uns alle rings umher auf den Raſen und zwei von den Muſikanten nahmen ein Töpſchen, worin Kaffee und auch ſchon Milch war, vom Feuer, helten Brod aus ihren Manteltaſchen hervor, und tranken abwechſelnd aus dem Topfe, und es ſchmeckte ihnen ſo gut, daß es ordentlich eine Luſt war anzuſehen. Der Waldborniſt aber ſagte: „Ich kann das ſchwarze Geſöff nicht vertragen," und reichte mir dabei die eine Hälfte von einer großen, übereinander gelegten Butterſchnitte, dann brachte er eine Flaſche Wein zum Vorſchein. „Will der Herr nicht auch einen Schluck?" Ich that einen tüchtigen Zug, mußte aber ſchnell wieder abſetzen und das ganze Geſicht verziehen, denn es ſchmeckte wie Drei-Männer Wein. „Hieſiges Gewächs," ſagte der Waldborniſt, „aber der Herr hat ſich in Italien den deutſchen Geſchmack verdorben."

(*b*) Athemloſer hatte nie eine Gemeinde ihrem Seelenhirten gelauſcht und inbrünſtiger niemals im ſtillen Gebet ſich geſammelt, als da jetzt der ehrwürdige alte Mann ſeine dürren Hände erhob und über die Ausziehenden und Zurückbleibenden den Segen ſprach. Auch war keine heilige Handlung jemals andächtiger begangen worden, als die, deren Schauplatz nun, nachdem Geſang und Orgel verſtummt waren, das Gotteshaus wurde.

(*c*) Parse fully :—nahmen, abwechſelnd, gelegten, verdorben, andächtiger.

(*a*) The fire blazed cheerfully in the forest, the morning was fresh, and we all sat down round about on the turf. Two of the musicians took a little pot, in which were milk and coffee, from the fire, and produced some bread out of their cloak-pockets. They drank one after another out of the pot and they enjoyed it so much that it was really a pleasure to look on. The bugler (horn player) however said: 'I cannot bear the black stuff,' at the same time handing me half of two huge slices of bread and butter laid one over the other. Next he drew forth a bottle of wine. 'Will the gentleman take a drink?' I took a vigorous pull, but was suddenly forced to desist, and make a wry face, as it tasted like 'Drei-Männer' wine. 'Home produce,' said the player, 'but the gentleman has spoilt his German taste in Italy.'

(*b*) Never had a community listened more breathlessly to the pastor of their souls, and never (had a community) more ardently united in silent prayer than when now the venerable old man raised his withered hands and pronounced the benediction over those who were about to depart and those who remained behind. Moreover, no holy deed was ever more devoutly undertaken than that (deed), the scene of which, after the organ was silent, and the singing was over, was the house of God.

(*c*)

nahm-en—irreg. or strong verb, imperf., indic., act., 3rd., plur. of nehm-en (nahm, genommen), agr. with its subj. zwei.
ab-wechſel-nd—adj. used adverbially, modifying nahmen.
ge-leg-t-en—past part. used adj., fem., sing., dat. case, agr. with Butter-ſchnitte, which is gov. by von.
ver-dorb-en—past part. of strong inseparable verb, ver-derb-en (ver-darb, ver-dorb-en), conjugated with hat.
an-dächt-ig-er—adj. used adverbially, modifying war begangen worden.

Section II.

Translate into German:

We are at the village. All is quiet in the street; the houses are shut up, here and there a window is open, but nobody looks out of it. The swallows fly near the ground, and have no occasion to avoid any one. At the fountain by the townhall are other swallows, who drink, survey one another sagely, twitter, and hold a council, as if the village belonged to them alone. Distinguished water-wagtails trip up to them, wag their tails (ſchwänzeln), and are quite silent, as if they would thereby announce that they knew all, and knew it far better.

Wir ſind an dem Dorfe. Alles iſt ruhig in der Straſſe; die Häuſer ſind geſchloſſen, hie und da iſt ein Fenſter offen aber Niemand ſieht hinaus. Die Schwalben fliegen nahe an dem Boden und finden es nicht nöthig Jemanden zu vermeiden. An der Quelle bei dem Rathhauſe ſind andere Schwalben, die trinken, ſehen einander klug an, zwitſchern und halten eine Verſammlung als ob das Dorf ihnen allein gehörte. Auſerwählte Bachſtelzen trippeln ihnen entgegen, ſchwänzeln, und ſchweigen, wie wenn ſie dadurch ſagen wollten, ſie wiſſen alles, und kennen alles viel beſſer.

Section III.

1. What kinds of nouns are (as a rule) of the neuter gender? Give examples.

2. Write in German: (*a*) The days are shorter in winter than in summer. (*b*) The days are shortest in winter. (*c*) The twenty-third of November, 1833. (*d*) Which book do you wish to see? (*e*) I leave that alone. (*f*) There are men who cannot see.

3. What cases are governed by the prepositions während, bei, ſeit, ohne, respectively? Give examples.

4. Write down the second person singular of the present indicative, and the past participle, of beißen, erlöſchen, geneſen, meſſen, ſchelten, werfen.

(1) (*a*) The generic names of animals are neuter, as das Kind, das Pferd, das Rind, das Schwein, das Huhn, das Schaf; (*b*) diminutives ending in chen and lein are neuter, as das Mäd-chen, das Fräulein; (*c*) collective nouns beginning with ge are neuter, as das Ge-birge; (*d*) most nouns beginning with ge are neuter; (*e*) all infinitives used as nouns are neuter, as das Leben, life; das Wiſſen, knowledge; (*f*) undeclined adjectives used as nouns, as das Berliner Blau, Prussian blue; (*g*) names of letters, musical notes, etc., as das A; (*h*) any *quoted* word is neuter, as ein groſſes Ich, a great I; das Aber, *the (word) but*; (*i*) names of countries, provinces, towns, as (das) Frankreich (das) Baiern; (*j*) nouns ending in tum (thum), nis, ſal, ſel, are mostly neuter, as das Biſ-thum, bishopric; das Ereig-nis, occurrence; das Scheu-ſal, monster; das Rät-ſel, riddle.

(2) (*a*) Im (= in dem) Winter ſind die Tage kürzer als im Sommer. (*b*) Im Winter ſind die Tage am kürzeſten. (*c*) Den drei und zwanzigſten November, achtzehn hundert drei und dreiſſig. (*d*) Welches Buch wünſchen Sie zu ſehen? (*e*) Ich laſſe es ſein. (*f*) Es giebt Menſchen die (or welche) nicht ſehen können.

(3) Während governs the genitive, as während des Prozeſſes, during the lawsuit; während sometimes takes dative, as während dem Regen, during the rain; bei always governs dative, as bei meinem Freund, at my friend's; ſeit always governs dative, as ſeit jener Zeit, since that time; ohne always governs accusative, as ohne deinen Bruder, without thy brother.

(4)

INFIN.	2ND SING. PRES. INDIC.	PAST PARTICIPLE.
beiſſ-en.	du beiſſ-eſt.	ge-biſſ-en.
er-löſch-en.	„ er-löſch-eſt or „ er-liſch-eſt	er-loſch-en.
geneſ-en.	„ geneſ-eſt.	geneſ-en.
meſſ-en.	„ miſſ-eſt.	ge-meſſ-en.
ſchelt-en.	„ ſchilt-ſt.	ge-ſcholt-en.
werf-en.	„ wirf-ſt.	ge-worf-en.

Male and Female Candidates.

SECOND YEAR.

German.

Male Candidates may answer questions in *two* languages; *Female* Candidates in *one* only.

Two *hours allowed for this Paper for Male Candidates*; THREE *hours for Female Candidates.*

N.B.—German words must be written in English characters.

Section I.

Translate into English:—

(*a*) Der Fremde wußte nicht, ob er ſich ſchämen, ob er zürnen oder lachen ſollte, widerſtreben oder folgen. Wie ein paar Kampfhähne ſtanden ſich beide eine Weile beobachtend gegenüber; der kleine Hund mitten inne, knurrend und bellend, fuhr dem Schultheiß gegen die Waden.

(*b*) Ein böſes Jahr kam über das Land, ein plötzlicher Kriegslärm alarmirte die deutſchen Grenzländer im Oſten, darunter auch unſere Provinz. Die furchtbaren Folgen eines heftigen Landſchreckens wurden ſchnell fühlbar. Der Verkehr ſtockte, die Werthe der Güter und Waaren fielen, jeder ſuchte, das Seine zu retten und an ſich zu ziehen, viele Capitalien wurden gekündiget, große Summen, welche in kaufmänniſchen Unternehmungen angelegt waren, kamen in Gefahr.

(*a*) The friend knew not whether he ought to be ashamed, be angry or to laugh, resist or obey. Like two game-cocks both stood for a time opposite one another on their guard; the small dog between them, growling and barking, flew at the magistrate's calves.

(*b*) A bad year came over the land; a sudden cry of war alarmed the people of the eastern frontiers, and amongst the rest, our province. The terrible consequences of the violent panic in the country were quickly perceptible. Commerce was stopped, the value of goods and merchandise fell, every man tried to save and keep his own, much capital was called in, and large sums of money, which were invested in mercantile transactions, ran great risks.

Translate into English:—

(*a*) Vergebens widerſtreben wir dem König,
Die Welt gehört ihm; wollen wir allein
Uns eigenſinnig ſteifen und verſtocken,
Die Länderkette ihm zu unterbrechen,
Die er gewaltig rings um uns gezogen.
Sein ſind die Märkte, die Gerichte, ſein
Die Kaufmannsſtraßen, und das Saumroß ſelbſt,
Das auf dem Gotthardt ziehet, muß ihm zollen.
Von ſeinen Ländern wie mit einem Netz
Sind wir umgarnet rings und eingeſchloſſen.

(*b*) Ich lebte ſtill und harmlos — das Geſchoß
War auf des Waldes Thiere nur gerichtet,
Meine Gedanken waren rein von Mord —
Du haſt aus meinem Frieden mich heraus
Geſchreckt, in gährend Drachengift haſt du
Die Milch der frommen Denkart mir verwandelt;
Zum Ungeheuren haſt du mich gewöhnt —
Wer ſich des Kindes Haupt zum Ziele ſetzte
Der kann auch treffen in das Herz des Feind.

(*a*) In vain, by force, we strive against the king,
The world belongs to him; (in vain) resolve
Resistance stern to make and brace ourselves
To burst the chains which neighbouring lands have forged,
Which chains around us he now firmly draws.
The markets all and courts to him belong,
The merchants' paths are his, the packhorse self,
Which o'er St. Gothard goes, must pay him toll.
By his possessions, as within a net,
We are ensnared and 'compassed round about.

(*b*) Harmless and quietly I lived—my shafts
Against the forest-beasts alone were aimed,
Guileless and free from murder were my thoughts—
By terror thou hast chased away my peace;
To dragon's deadly poison hast thou changed
The milk of all my kindly, friendly thoughts;
With monstrous crime I am familiar made—
Who can his child's loved head his target make,
The same can also pierce his foeman's heart.

SECTION II.

Translate into German:—

Whenever I approached a peasant's house towards night-fall, I played one of my most merry tunes, and that procured me not only a lodging, but subsistence for the next day. I once or twice attempted to play for people of fashion, but they always thought my performance odious, and never rewarded me even with a trifle. This was to me the more extraordinary, as whenever I used in better days to play for company, when playing was my amusement, my music never failed to throw them into raptures, and the ladies especially: but, as it was now my only means, it was received with contempt: a proof how ready the world is to underrate those talents by which a man is supported.

So oft ich gegen Abend mich einer Bauerhütte näherte, ſpielte ich eines von meinen luſtigen Stückchen, und das verſchaffte mir nicht nur eine Herberge, ſondern auch Unterhalt für den folgenden Tag. Ein oder zwei Mal verſuchte ich es vor Leuten von Mode zu ſpielen; aber mein Spiel däuchte ihnen immer odiös, und ſie gaben mir nie die geringſte Kleinigkeit dafür. Dies war mir um ſo ausfallender, als, ſo oft ich in beſſern Tagen, wo Flötenblaſen nur meine Unterhaltung war, etwas vortrug, mein Spiel die Geſellſchaft jedes Mal, und beſonders die Damen, entzückte. Jetzt aber, wo es mein Unterhalt war, wurde es mit Verachtung angehört — ein Beweis, wie bereitwillig die Welt iſt, Talente gering zu ſchätzen, aus welchen Jemand einen Erwerb macht.

SECTION III.

1. Explain the construction of the following two lines, and translate them accurately:—

Es hieß, er denk' ihn ganz daran zu kürzen
Mit einem Biſchofshut ihn abzufinden.

2. What is the force of ſoll in the line „Ich ſoll der Mörder werden meines Kinds!" and of läßt in „Nur ſchlecht Geſindel läßt ſich ſehn"?

3. How is the pronoun wer used? Give examples.

4. Give the first person singular of the present, imperfect, and perfect tenses of the compound verb beiſtehen.

5. Explain the force of the adverbs in the sentences: Der Augenblick iſt da, mich zu befreien. Wo kommt er her? Sonſt war ich ſelber mit in Feld und Wald. Der Landvogt wird noch heute von dort erwartet.

(1) Es hieß, er denke, etc., it was said (that) he thought to lessen him completely thereby and to satisfy him with a bishop's mitre. Verbs of *declaring*, *answering*, *thinking*, etc., when used in the imperfect tense (hieß), take the subjunctive mood after them, with or without daß. The verb may be in the imperfect or (as here denke) in the present subjunctive. If daß be used the *verb* must be placed *last*, but if daß be omitted the verb is placed as in the English order.

(2) 'I *am to* (I *must*) be the murderer of my child!' = '*Am I* to (*must* I) be the murderer, etc.?' 'Only the wretched rabble appears.' Sehen laſſen = to show; ſich ſehen laſſen = to appear. Laſſen = to cause, when followed by an infinitive which is then translated in English by the *passive* infinitive.

(3) Declension of wer. (It has no plural.)

	MAS. & FEM.		NEUT.	
N.	wer	who?	was	what?
G.	weſſen	whose?	weſſen	of what?
D.	wem	to whom?	wem	to what?
A.	wen	whom?	was	what?

Wer *is used interrogatively.* Wer iſt da? Who is there? Wer ſeid ihr? Who are you (plural)? Weſſen Buch iſt das? Whose book is that? Wem haben Sie mein Buch gegeben? To whom have you given my book? Wen hat der Bruder gefragt? Whom did the brother ask? Was denken Sie? What do you think? Was für einer, e, es = what sort? Wer *is used as a relative pronoun when* der *precedes or follows it*, as—

Wer ſich des Kindes Haupt zum Ziele ſetzte,
Der kann auch treffen in das Herz des Feind.

Was as a relative = *that which*, French *ce qui*, *ce que*, as Nehmen Sie, was ich da ſage, ja nicht als einen Vorwurf auf, = *what I say* = *ce que je dis*. Wer er auch (immer) ſei = *whoever* he may be: was auch = *whatever*.

(4) Pres., ich ſtehe bei: imperf., ich ſtand bei: perf., ich bin beigeſtanden.

(5) The hour of freedom *has come* (lit., *is there*, *i.e.*, *here*). *Whence* (wo-her), does he come? (*i.e.*, *here*, towards the speaker). Wo geht er hin? *Whither* is he going? (*i.e.*, *yonder*, hin, towards a third person). *Formerly* I myself was *there* (*i.e.*, *with* any person) in field and forest. The governor is expected from *there*, *this very day* (*before the day is over.* Noch implies that there is *still* (noch) time for the governor to come *to-day*).

(To be continued.)

Statistics for Teachers.

BY W. H. HARVEY, B.A. (LON.)

Captain Cuttle's well known dictum with respect to making notes of facts as soon as found holds good with special force in connection with statistical information. Many school books which are excellent in other respects have their value impaired by the antiquated character of their statistics. It is with a view to enabling teachers to put Captain Cuttle's advice into practice by correcting their text-books themselves, that the following items have been collected.

Population, &c.—The estimated population of England and Wales in the middle of last year 1887 was 28,247,000, of whom 18,041,000 are ascribed to town districts and the remaining 10,206,000 to country districts. The estimated number of persons in Scotland at the same period was 3,991,000. In respect to area England and Wales together stand credited with 37,319,000 statute acres, Scotland with 19,639,000, and Ireland with 20,323,000; the last named country had an estimated population in the middle of 1885 of 4,963,000 persons.

The Registrar-General's returns give the following as the estimated populations of 31 large towns in the United Kingdom at the middle of 1887:—

	inhabs.		inhabs.
London	4,215,192	Portsmouth	137,917
Liverpool	592,991	Oldham	134,158
Glasgow	524,039	Sunderland	129,684
Birmingham	441,095	Brighton	118,186
Manchester	377,529	Blackburn	116,844
Dublin	353,082	Bolton	112,354
Leeds	345,080	Cardiff	104,580
Sheffield	316,288	Preston	102,283
Edinburgh	258,629	Birkenhead	97,703
Bradford	224,507	Derby	94,006
Nottingham	224,230	Norwich	92,848
Bristol	223,695	Huddersfield	90,034
Salford	218,658	Wolverhampton	80,847
Hull	196,855	Halifax	79,207
Newcastle	157,048	Plymouth	77,127
Leicester	143,153		

Imports and Exports.—With respect to the Imports and Exports of the United Kingdom in 1887 the following lists may be interesting to teachers, since the items are arranged in the order of their declared values for the year (the values being also appended) and the lists consequently show the relative importance of the various articles from a commercial point of view.

IMPORTS (1887).

	£
Grain and Meal	47,819,000
Provisions	40,526,000
Raw Cotton	39,897,000
Wool	25,983,000
Metals	16,618,000
Sugar and Molasses	16,515,000
Silk	13,302,000
Timber	11,989,000
Tea	9,859,000
Seeds	6,992,000
Hemp and Jute	5,847,000
Fruits	5,771,000
Wines	5,468,000
Coffee and Chiccry	4,334,000
Tobacco	3,409,000
Hides	3,132,000
Flax	2,708,000
Oils	2,326,000
Spirits	2,012,000
Rice	1,878,000
Indigo	1,673,000
Tallow	1,074,000
Guano	186,000
Making, with many others, a total value of	£361,935,000

EXPORTS (1887.)

	£
Cotton Manufactures	59,577,000
Iron	25,000,000
Woollen Manufactures	20,585,000
Cotton Yarn	11,379,000
Machinery	11,146,000
Coals and Culm	10,176,000
Linen Manufactures	5,455,000
Woollen Yarn	3,970,000
Apparel	3,941,000
Copper and Brass	3,005,000
Hardware	2,920,000
Leather Manufactures	2,469,000
Haberdashery and Millinery	2,349,000
Silk Manufactures	2,326,000
Beer and Ale	1,678,000
Books, Printed	1,175,000
Lead and Tin	1,147,000
Spirits	1,018,000
Linen Yarn	939,000
Stationery	831,000
Salt	525,000
Soap	451,000
Silk Yarn	439,000
Plate and Watches	329,000
Candles	181,000
Butter	156,000
Cheese	57,000
Making, with many others, a total value of	£221,398,000

Big Ports.—According to the *South Wales Daily News* the following is a list of the ten largest ports of the world arranged in their order of precedence. The tonnage appended is the amount entered inwards and cleared outwards during one year, and does not include mere coasting trade which simply indicates the trade which any particular nation has with itself. The Per-Centage added in brackets after the tonnage shows the increase per cent. in fifteen years, and may therefore be taken as a fair criterion of the future prospects of the several ports.

1st	London	12,165,326	tons	(46 p. c.)
2nd	New York	11,886,801	,,	(94 p. c.)
3rd	Liverpool	9,944,918	,,	(16 p. c.)
4th	Marseilles	8,376,871	,,	(102 p. c.)
5th	Hamburg	7,578,837	,,	(86 p. c.)
6th	Cardiff	7,250,376	,,	(152 p. c.)
7th	Tyne Ports	6,995,501	,,	(46 p. c.)
8th	Antwerp	6,801,890	,,	(75 p. c.)
9th	Genoa	5,406,769	,,	(170 p. c.)
10th	Bilbao	5,274,452	,,	(427 p. c.)

Although it is satisfactory to note that four of these ten big ports are British, the fact that from a percentage point of view they do not (with the exception of Cardiff) seem to keep pace with the foreigners is not so pleasing. It appears indeed that the position of London as the first port in the world is doomed, and that New York will very soon take its place. It may be remarked that the above statistics are obtained from the Shipping returns for the years 1886 and 1887.

The following five ports, of which it will be noticed three are British, ought perhaps to be added to the above list, although they are to a great extent merely 'ports of call' for orders, or for 'transhipment,' or for 'coaling,' and not ports for the import and export of goods in the sense the others are:—

1st	Hong Kong	9,080,390	tons	(143 p. c.)
2nd	Malta	8,884,059	,,	(109 p. c.)
3rd	Gibraltar	8,609,730	,,	(120 p. c)
4th	Port Said	5,767,656	,,	(396 p. c.)
5th	Constantinople	5,195,242	,,	nil.

British Steamships.—With respect to the tonnage of mercantile steam shipping the British position is unapproachable, for not only is it much larger than that of any other nation, but it actually surpasses by nearly a million tons all the rest of the world put together. The British fleet of steamers registered in 1885 no less than 4,293,115 tons with an increase of 257 per cent. during the preceding fifteen years, while the whole combined foreign fleet of steamers registered but 3,308,511 tons, with an average increase of only 102 per cent. In this foreign fleet was included also the vast tonnage of steamers on the rivers and lakes of the United States, amounting to 1,308,511 tons with 48 per centage of increase.

In 1886 France was credited with possessing 500,000 tons of steam merchant ships, Germany 453,000, and Italy with 144,000 tons.

Oral Teaching: The Preparation of Lessons and of Notes of Lessons.

BY JOSEPH H. COWHAM, F.G.S.,

Master of Method: Westminster Training College.

In the following chapters it is proposed to furnish help to pupil teachers and others in the preparation of their lessons. The course will include directions for lessons in all the subjects of school instruction illustrated by typical 'Notes of Lessons' in each branch of school study.

Oral Teaching a form of Conversation. – We acquire readily and retain permanently that which we converse about. Our knowledge of a given subject may be limited, but by speaking to others who have fuller knowledge our area of information becomes widened, errors are corrected, that which we already know is confirmed, and the whole subject becomes indelibly fixed in the mind.

In teaching a class of children the teacher converses orally, in turn, with all his pupils, and if he has the full attention of his class the conversation throughout the lesson is shared by all its members.

When all the scholars in a class thus share in its work we have that condition of oral teaching which is most effective in brightening the entire school life and work.

A few lessons of a conversational kind taken with the sole object of arousing the united thought and combined effort of a whole class will be found of high educational value even though the information imparted cannot be utilized on the day of examination.

Children should be encouraged to speak.— Mr. Fitch in his Lectures on Teaching says: 'If the teacher does all the talking and the pupil only responds with single words the questioning is bad. The great object should be with the minimum of your own words to draw out the maximum of words and of thought from him.' This is very sound advice; it has been repeated in text-books of school method; it is impressed upon the student teacher and pupil teacher in lectures and by personal advice; the fault, however, of the teacher speaking far too much and the pupil far too little still manifests itself in almost every lesson. In the advice which these chapters are intended to offer to young teachers on the preparation and the giving of their lessons, the importance of arousing the thought and afterwards of exercising the speech of their pupils will be constantly kept in view.

(1) **If an object or a picture** be brought before the class it is not sufficient for the teacher to exhibit it and to talk about it. The children must be allowed to examine it for themselves; if the object or picture cannot be submitted to all for personal inspection, allow one or more to take it in hand, and encourage these to state what they see to the entire class.

Next to speaking himself it is important that the scholar should listen to the speech of a fellow scholar. Children learn to speak more quickly and easily from mixing with and talking to other children than from hearing the speech of adults.

(2) **A grammar lesson** provides abundant opportunity for the exercise of speech on the part of the scholar. After a few typical examples have been supplied by the teacher and the point or principle in grammar which they illustrate has been seized by the class, then call upon the scholars to make other examples which similarly illustrate the principle or rule under discussion. When apt examples can thus be formed by the class they afford reliable evidence that the rule is known. The next and higher effort will be to allow the pupils to state the truth which their examples illustrate. In this way the grammar lesson may be made an excellent means of exercising the powers of speech which the children possess.

Correct speech is closely connected with sound thought, so connected in fact that they act and re-act upon one another, for whilst no one can speak correctly who does not think clearly, so no one can indulge in loose and incorrect speech without weakening his power of clear thought. The young teacher is therefore strongly advised to form early the habit of speaking well himself and then of requiring correct speech on the part of his class.

It is surprising how soon the speech of a group of children working together can be improved. If a teacher who has not practised his class in speaking in complete sentences will test his scholars the next time he takes them for an oral lesson he will find that not more than one child out of ten will attempt a complete reply.

If, for example, a process in Arithmetic is being explained—Twenty sheep are bought at the rate of two pounds each, and a boy is asked how to find the total cost; the reply will be 'Multiply.' The answer is no doubt correct, in so far as the boy's words exhibit to us the process he would employ; he should, however, be encouraged to say, 'Multiply the two pounds by twenty,' or still better' Multiply the cost of one by the number of sheep bought.'

Single word answers on the part of scholars as a rule should be discouraged. Children should be led to amplify them into complete sentences, and very rarely indeed should a question be so formed as to require single words for answer.

Avoid the elliptical form of question. The answers are very readily supplied, and the teacher is apt to be misled by his apparent success. A habit of using the elliptical form of question is easily contracted, and is very difficult to correct, and when extensively indulged it is very weakening in its effects both on the thought and the speech of the class.

So far three truths are briefly sought to be established.

(1) That oral teaching should as far as possible be conversational—that anything of the nature of a lecture should be avoided.

(2) That as expression by speech serves to fix and give directness to our thought, the teacher should use language carefully himself and require accurate and complete statements from his scholars.

(3) That children should in every way be encouraged to exercise their powers of speech during the progress of a lesson, and that all forms of questioning which foster incomplete statements on the part of the scholar should be avoided.

NOTES OF A BIBLE LESSON ON 'THE SIN OF ACHAN'—Josh. vii., 19—21 verses.

CLASS.—Senior Division of———School———.

TIME.—Thirty-five minutes.

INFORMATION AND LESSONS.

1. Introduction and statement of the main facts of the narrative.

(*a*) Israelites take Jericho.
(*b*) Command concerning the spoil.
(*c*) Spies sent to Ai; 3000 men defeated, 36 slain.
(*d*) Distress of Israelites followed by their Prayer.

Lesson I.

Prayer in time of distress.

(*e*) Sin discovered by casting lots.
(*f*) Achan accused before the assembled multitude.

2. Joshua's Address.

(*a*) My son = no expression of anger on the part of Joshua.
(*b*) Give Glory to God.
God's Omniscience.
(*c*) Make confession to God. Tell me now what thou hast done.

Lesson II.

'Be sure your sin will find you out.'

3. Achan's Answer.

Indeed I have sinned against the Lord:—

(*a*) **I saw**:— (1) A Babylonish Garment very costly.
(2) 200 shekels of silver = £25.
(3) A wedge of gold.
(*b*) **Sin of covetousness.**
(*c*) And took: **sin of theft.**

Lesson III.

The danger of desiring what is not our own; if not checked it may lead to theft.

(*d*) They are hid in the earth.
(1) Troubled conscience.
(2) Stolen goods of no value to him.

Revision of steps in Achan's Sin.
(1) Sees, thinks about the goods.
(2) Desire arises, watches for opportunity.
(3) Takes, and hides in his tent.

Lesson IV.

One sin frequently leads to another.

4. The Punishment of Achan's sin.

(*a*) Himself.
(1) A troubled conscience.
(2) Exposure before all Israel.
(3) Death by Stoning.
(*b*) Others.
(1) His whole household suffer with him: always so with sin.
(2) 36 men slain before Ai.

TEACHING HINTS AND ILLUSTRATIONS.

(*a*) Narrate vividly (1) the taking of Jericho, and (2) the command made by God concerning the Spoil.

Enforce (*b*) It is the '*Key to the Story.*'

(*c*) Describe Ai. Show on a map. Small town. No fear on the part of Israelites setting out against it. **Picture the sudden return and defeat.**

(*d*) State Joshua's perplexity. The Israelites filled with fear. God had aided them at Jericho, he would surely aid them again. In their misery they '*pray to God.*' **Enforce the Lesson.**

(*e*) Describe the scene:—
(1) All Israel assembled.
(2) Achan, who thought himself secure, stands out as the culprit.
(3) Joshua addresses him.

Read the passage with the children.

(*a*) State that whilst sorry for the sin and its consequences Joshua did not manifest hatred towards the sinner.

(*b*) By giving proof to the assembled Israelites of **God's Omniscience** by making **a full confession of guilt.**

Picture the guilty one, he only knew what sin had been committed. Now he is discovered.

Ask for this passage.

Read this over impressively. It conveys, without any comment, the wretched state of Achan.

(*a*) Briefly describe each. Enforce clearly that there was '**Nothing wrong in viewing them.**' We visit museums for the purpose of seeing such things.

(*b*) Picture the man lingering near; desire to have them arises. Now Achan **breaks a Commandment.** Ask children to name it.

(*c*) He did more. **Ask for the second Commandment broken.** Give advice to children 'To turn from objects if they find themselves devising means to obtain them.'

(*d*) Picture Achan, unable to rest. Ask what makes him uneasy? No one sees him: **Conscience.** He cannot use his ill-gotten gains.

Ask individual children for each step.

And for the lesson this enumeration of crimes teaches.

Each lesson, as it is taught, may be repeated by the children, and the whole of them written out at the close of the lesson.

(*a*) (1) Refer again to hiding in the tent; children will say what this showed. (2) Refer again to the assembled Israelites and Achan standing out as the criminal. (3) Briefly state death without entering into minute details.

(*b*) State the fact, and thus lead the children to see the effects of crime upon:—
(1) Whole families.
(2) Entire communities.

Knitting Maps.

BY MRS. J. D. HARRIS.

Heelless Stocking.

This absurd looking pattern is in reality a very comfortable stocking, and has several merits. In the first place, men will like it in the summer, as it is much cooler than an ordinary stocking, and thrifty housewives will certainly approve of it as it not only takes much less wool, but also saves both time and trouble; but it must be observed that it does not answer as a sock, as it requires to be well gartered.

4 oz. of fingering for a full sized stocking.
4 pins. No. 15 Chamber's bell gauge.
28 stitches on each pin.
Knit 2, purl 2 for 2½ inches.

A. Cast off all the stitches *loosely.*

B. Without breaking off your wool pick up 28 *stitches* again on each pin. Knit *plain* 10 *inches.*

C. Drop every other stitch. This leaves 14 on each pin.

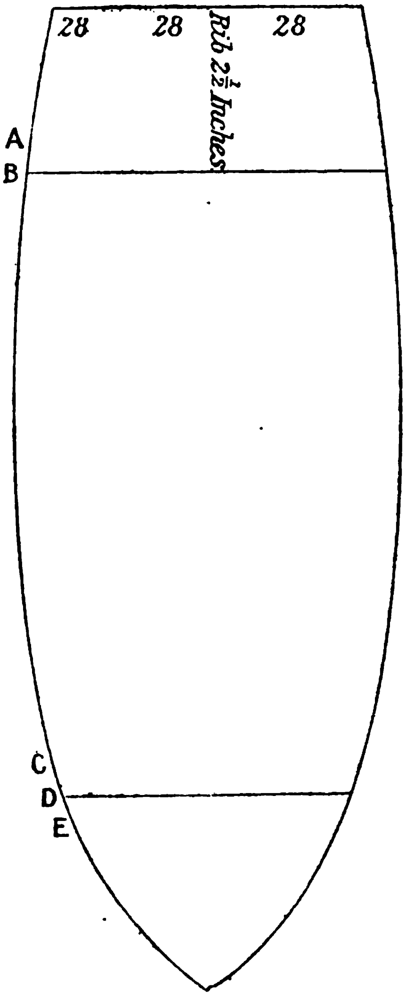
D. You must now add some stitches, otherwise the toe will be too small.
(This is best done by picking up and knitting the loop that is below the stitch on the pin, which is the stitch of the last round.) Add 6 stitches on 2 pins, and 8 on the other.
Now as each pin is knitted alike, you should mark one pin which will be the 1st in all succeeding rounds. Knit 2 rounds.

To Decrease for the Toe.

E *Knit 6. Knit 2 together. *Repeat for the whole round. Knit 6 rounds.
*Knit 5. Knit 2 together. *Repeat for the whole round. Knit 5 rounds.
*Knit 4. Knit 2 together. *Repeat. Knit 4 rounds.
*Knit 3. Knit 2 together. *Repeat. Knit 3 rounds.
Knit 2. Knit 2 together. *Repeat. Knit 2 rounds.
Knit 1. Knit 2 together. *Repeat.

Now knit 2 together till only 7 stitches are left. Put one on a pin. Knit the other 6 together and cast off.

Now pull out the stocking till the dropped stitches are all run down to the ribbing.



Pestalozzi.

BY THE REV. CANON WARBURTON, M.A.,

Formerly Her Majesty's Inspector of Training Colleges for Schoolmistresses.

CHAPTER IV.

Personal Recollections.

The author has recently, and quite unexpectedly, been put in possession of some original MSS. written from Yverdun Castle in the years 1819—22, and is permitted, by the kindness of the writer's daughter, to give a few extracts from them. It seemed desirable that, being chiefly of a personal character, these extracts should follow the account of Pestalozzi's life, and precede that of his system. The letters are numerous and interesting, but the special information bearing upon Pestalozzi is so much mixed up with matters of a private nature, that it cannot always be communicated to the general reader. The writer of these documents, the late Dr. Mayo, so well known in later life in connection with his school at Cheam, and with the Home and Colonial Training College—was, when a young man, engaged for some years as chaplain and English instructor in Pestalozzi's great institution at Yverdun, and the letters from him which follow will, it is hoped, be read with interest, as giving the fresh and unstudied expression of the writer's experiences of the place and of the man.

'1819.

'Yverdun.—On the margin of a lake, the length of which the eye is not certain that it defines, a collection of houses presents itself; a church steeple rises above the roofs, and near it four towers of no great elevation at the four angles of a large building, arrest your attention. . . . Observe it a little more attentively:—one tower, you perceive, is much higher than the other three; all circular and covered with something like an inverted "pottle" of tiling. They are connected by a plain frontage with a heavy sloping roof, pierced with irregular windows, and deformed with various appendages....Without grandeur, picturesque beauty, elegance or neatness, without excellence in form or colour, it presents the most uninteresting *mélange* of incongruous parts I ever beheld. This delectable *morçeau* of Swiss architecture you approach through a miserable avenue of starveling poplars, which you behold with more than ordinary disgust, from the disappointed hope which you had formed that when you quitted France you had seen the last of them....

'I was conducted to the château, and introduced to the principal members of the establishment. Several of them had assembled in the best room of the building, and among them Pestalozzi, whom, to do honour to the English clergyman, the institution had had washed, shaved, and dressed. This circumstance made the double salute with which he honoured me less overpowering than some I have since received. But you wish me to describe him:—he is then, to use a phrase more expressive than elegant, a little weazen old man, upwards of 70, stooping a good deal in the shoulders, but apparently from a habit of looking on the ground, and not from age or decay. There is nothing very remarkable in his countenance, no very peculiar expression of benevolence, no strong indication of a powerful mind, that I could discern. There is an air of abstraction, but that I think a very ambiguous sign, and it shows that the mind is prone to wander from the sphere in which the body actually moves, but it does not indicate whither it has wandered, or whether it is vigorously and efficiently occupied. His walk, when he is by himself, is a shuffle, effected by a curvilinear movement of his legs which, without lifting his feet from the ground, makes them form a kind of oval, completed by his bringing his toes into contact. When he is receiving guests, or leaving a room with strangers in it, he adds to the shuffle a kind of jerk, which, however, does not reach lower than his ankles.

'Schmid, the active manager of the institution, has much more of the air of a man of the world....The general cast of his face and figure indicates strength: he strikes you as a man of powerful mind, devoting its energies to practical purposes.'

'1819.

'It is delightful to live under the same roof with Pestalozzi: every action of his life is characterised by the most exuberant philanthropy. Had (this) been checked by a little more prudence, it would perhaps have produced more benefit to mankind.'

'1819.

'Things go on here pretty well. For myself I am quite satisfied, but Schmid wants in heart what P. wants in head. He (Pestalozzi) is a strong instance of the necessity of a little worldly prudence: the want of it has involved him in difficulties and hardships through life: has cooled his friends, heated his enemies, cramped his exertions for the good of others.'

'1821.

While we were sitting at dinner on Saturday, the Crown Prince of Denmark was abruptly ushered into the room. We all jumped up from our chairs. Old P. was as brisk as a bee—did the honours with his usual grace; while the rest of the party, one by one, made their escape. I had the honour of being introduced. He is a fine-looking man, affable and easy in his manner. The Princess was affected even to tears at the examination of the little children, and both declared that had they been educated in the same manner their knowledge would have been more extensive and more clear. These are our gleams of sunshine. . . . One honest John Bull, who was accidently born a peer of the realm (good honest man, he could not help it)—has been to see us, and cried out to her ladyship, "Come don't dawdle here—it's nothing more than the English plan, only more troublesome."

'Mrs. —— is continually boring P. with the praises of G——, (a gentleman to whom he once addressed a series of letters on the philosophy of education, but) from whom P. is now entirely estranged as a philosopher. He answers not a word. It is amusing to see them together. The other day she told P. that G—— had picked up *his* most beautiful ideas. He said not a word. She then observed that G—— had seized the spirit of the system better than any other Englishman. P. was silent. She then turned round to me and made the same remark in French. I parried the question in a manner that made P. laugh heartily. Schmid told me afterwards that P. was hugely tickled with what I said, and recounted the whole circumstance, laughing most immoderately. The next time P. saw me he placed both his hands on my shoulders and fell to laughing and kissing, kissing and laughing, so that a bystander must have taken him for a fool.'

'1821.

(Dr. Mayo having had an acute attack of illness) 'Pestalozzi was terribly uneasy; he could not rest till the symptoms declared themselves more favourable. He said, "*J'ai eu crainte, comme un pauvre diable.*" He comes early in the morning to my bedside, kisses my hand when I place it in his, and when I tell him I am better he is quite delighted, and exclaims, "*Grâces à Dieu—grâces à Dieu!*"'

(To be continued.)

—o—

Jeanne d'Arc, by Lamartine.

TRANSLATED BY A. M. BOWER,

Late Master in University College School, London.

JEANNE D'ARC.	JOAN OF ARC.
VIII.	
'Gracieuse de visage, elle croissait	'Of beautiful features, she grew up
leste et forte de ses membres.	agile and strong of limb.
Dans ces temps où	In those times when
les femmes ne faisaient route qu'à cheval,	women always travelled on horseback,
elle allait, enfant, avec ses frères,	she went, when a child, with her brothers,
conduire les poulains de son père	to take her father's colts (or foals)
dans le préau du château des Isles	into the paddock of the "chateau des Isles"
où on les enfermait	where they were shut up
de peur des gens de guerre.	for fear of (wandering bands of) soldiers.
Il est vraisemblable que c'est ainsi	It is probable that this was the way
qu'elle se familiarisa avec les destriers,	in which she became familiar with horses (steeds),
que nulle main d'homme	which no man's hand

ne mania plus hardiment depuis.	has since handled more daringly.
Elle raconte aussi	She relates also
qu'elle allait quelquefois	that she used sometimes to go
avec les jeunes filles du village	with the young village girls
à la lisière des bois	to the border of the woods
qui bordaient les champs,	which formed the limit of the village fields,
sous un grand chêne,	under a large oak,
qu'on appelait dans le pays *l'arbre des Fées;*	which was called in the country " The Fairies' tree;"
que sous ce chêne	that under this oak
il y avait une fontaine ;	there was a fountain ;
que son eau avait la renommée	that its water was celebrated
de guérir les fièvres et les maladies ;	for curing fevers and diseases ;
qu'elle en avait puisé,	that she had drawn some of the water,
comme les autres, à cette intention ;	like the others, with this intention ;
que les malades, après leur guérison,	that the sick, after their cure,
avaient l'habitude d'aller s'asseoir	were in the habit of going to sit down
et se délasser sous son ombre ;	and rest under its shade ;
que les fleurs de mai croissaient	that May flowers grew
autour de la source,	round the fountain,
et qu'en temps d'été	and that in summer
elle les cueillait avec ses compagnes,	she gathered them with her companions,
pour en tresser des chapeaux	in order to weave garlands with them
à la statue de la Notre-Dame de Domremy.	for the statue of Our Lady of Domremy.
La fille de sa marraine lui disait	The daughter of her godmother told her
que les fées ou les dames	that the fairies or the ladies
apparaissaient par aventure en ce lieu	appeared by chance in that spot
et qu'elle-même les avait vues.	and that she herself had seen them.
Quant à Jeanne,	As regards Joan,
elle ne les avait jamais vues.	she had never seen them.
Mais il est bien vrai	But it is quite true
que les jeunes filles	that young girls
suspendaient des chapelets de fleurs	hung up garlands
aux basses branches de l'arbre ;	on the lower branches of the tree ;
qu'elle avait fait comme les autres ;	that she had acted like the rest ;
que quelquefois ses compagnes	that sometimes her companions
emportaient les bouquets	used to carry away the bouquets
en s'en allant,	when they went away,
que d'autres fois	that at other times
elles les laissaient sur l'arbre ;	they left them on the tree ;
que, depuis le moment où	that, from the time when
elle avait conçu de délivrer la France,	she had conceived the idea of freeing France,
elle n'allait presque plus jamais	she hardly ever went again,
s'ébattre ainsi sous le chêne des Fées ;	to play under the Fairies' oak ;
qu'elle peut y avoir dansé	that she may have danced there
avant son âge de raison	before she knew what she was doing
avec les enfants, et surtout chanté,	with the children, and especially sung there,
mais qu'elle ne croit pas	but that she does not believe

y avoir dansé	that she danced there
une seule fois depuis ;	a single time since ;
qu'il y avait aussi,	that there was also,
en face de la porte de son père,	before her father's door,
un autre bois voisin de la maison,	another wood near the house,
mais qu'il n'y avait pas là d'apparitions ;	but that there were no apparitions there ;
qu'à l'époque où	that at the time when
sa mission lui fut révélée,	her mission was revealed to her,
son père lui avait bien dit,	her father had warned her,
en la grondant,	while scolding her,
que le bruit courait	that the report ran
qu'elle avait pris ses inspirations	that she had received her inspiration
sous l'arbre des Fées ;	under the Fairies' tree ;
qu'elle lui avait répondu	that she had replied
que cela n'était pas ;	that such was not the case ;
qu'un prophète du pays	that a prophet of the land
disait bien que du bois Chênu	had predicted that from the oak wood
sortirait une jeune fille	should come forth a young maiden
qui ferait des merveilles,	who would perform wonders,
mais qu'à cela même	but that even to this (prophecy)
elle n'avait pas donné foi !...'	she had given no credence.'
Elle se complaisait à rappeler	She found pleasure in recalling to mind
dans sa prison ses souvenirs d'enfance.	(when) in her prison the memories of her infancy.
Elle s'y réconfortait	She found comfort in it
comme d'une fraîcheur de son matin,	as in the freshness of her morning,
et elle écrivait ainsi,	and she thus wrote,
sans le savoir,	without knowing it,
ces années obscures de sa vie	these obscure years of her life
dans lesquelles on aime	into which we love
à plonger du regard,	to look searchingly (lit. *to plunge with our looks*),
pour voir de quelle obscurité	to see out of what obscurity
est sortie la gloire et	our glory has emerged
de quelle félicité le martyre.	and from what (former) happiness our martyrdom.
Un de ces prophètes populaires	One of these popular prophets
qui sèment les rumeurs de l'avenir	who scatter prophecies of the future
à tout vent,	broadcast (lit. *to every wind*),
bien sûr que la crédulité	quite convinced that the credulity
naturelle aux âges d'ignorance	natural to ages of ignorance
les recueillera, l'enchanteur Merlin,	will accept (believe) them, the enchanter (conjurer) Merlin,
fameux dans les poèmes de l'Arioste,	celebrated in the poems of Ariosto,
avait écrit que les calamités du royaume	had written that the disasters of the kingdom
viendraient d'une femme dénaturée,	would proceed from an unnatural woman,
et que le salut viendrait	and that its salvation would come
d'une jeune et chaste fille.	from a young and chaste maiden.
Ce bruit remuait l'imagination	This saying stirred the imagination
du peuple dans ces provinces	of the people in these provinces
et pouvait susciter dans l'esprit	and was calculated to arouse in the mind
de chaque jeune vierge	of each young virgin
la pensée involontaire	the involuntary thought

de réaliser en elle la prophétie.	of fulfilling in herself the prophecy.
La beauté méditative	The meditative and contemplative
et recueillie de Jeanne,	beauty of Joan,
en attirant les yeux des jeunes hommes,	while attracting the eyes of the young men,
intimidait la familiarité.	repelled all familiarity.
Plusieurs cependant,	Several however,
charmés de sa grâce et de sa modestie,	smitten with her grace and modesty,
la demandèrent à ses parents.	asked her in marriage from her parents.
Elle s'obstinait à rester seule et libre,	She persisted in remaining single and free,
on ne sait par quel pressentiment	we know not from what presentiment
qui lui disait sans doute	which no doubt whispered to her
qu'elle aurait à enfanter un jour,	that she was destined to become the mother some day,
non une famille, mais un royaume.	not of a family, but of a nation.
L'un de ses prétendants,	One of her suitors,
plus passionné,	more ardent (than the rest),
osa réclamer son cœur	had the presumption to claim her hand
comme un droit,	as a right,
jurant en justice	and to swear in a court of law
qu'elle lui avait promis	that she had plighted to him
sa foi de mariage.	her marriage vows.
La pauvre fille honteuse, mais indignée,	The poor girl, ashamed but indignant,
comparut à Toul devant les juges	appeared at Toul before the justices
et démentit par serment	and contradicted on her oath
ce calomniateur par amour.	this slanderer through love.
Les juges reconnurent le subterfuge	The judges saw through the lie
et la renvoyèrent libre à la maison.	and sent her home free.

Grammatical Notes, Questions, Sentences, and Pieces for Translation to Jeanne d'Arc.

CHAPTER VII.

Devait = was to. Devoir = to owe, must, be obliged or bound, have to; to be (to); to be intended; should, ought. Vous devez (must) être fatigué. Comme vous *avez dû* souffrir = how you *must have* suffered. Il a dû payer le dégât = he has had (= been obliged) to pay for the damage. Cela ne se doit pas = that must not be done. Je le dois = I ought to or must do it. Je *dois* lui répondre demain = I *am to* answer him to-morrow. Je crois *devoir* lui répondre = I think I *ought* to answer him. Il semblait *devoir* réussir = he seemed *sure* to succeed. Vous *deviez* sortir = you *were obliged* to go out, were to go out, ought to have gone out. Vous *devriez* sortir = you *ought* to go out. Vous *auriez dû* sortir = you *ought to have* gone out. By carefully studying the above examples the student will henceforth find no difficulty in translating this difficult verb. Que donne l'aisance: note the order. When the subject (l'aisance) after *que* is longer than the predicate (*donne*) the subject is then placed after the verb. This rule is very important in translating correctly the text.

Study the following sentences: *Quelques* défauts *que* vous *ayez* (subj.) = whatever faults you may have. *Quels que* soient vos défauts = whatever your faults may be. *Quelque* (indeclinable) grands *que soient* vos défauts = *however* great your faults may be. *Quelque* (indecl.) savamment *que* vous parliez = *however* learnedly you may speak. Quelque (indecl.) cinq cents hommes = some (*i.e.* about) 500 men. Rule: quelque is invariable before adjectives, adverbs, and cardinal numbers, but before a plural noun it takes s. *Etaient* allées = *had* gone. The verb être not avoir must be used with intransitive verbs like aller, tomber, arriver, sortir, partir, devenir, entrer. Et se charger du fardeau = and to load herself with the burden. Bien que, quoique, afin que, que, jusqu'à ce que, à moins que and que = si, take the subj. Elle ne savait ni: savoir = pouvoir and in this sense takes only one negative. Ce métier où; où = dans lequel; où = quand; où que = wherever. Que de fois = combien de fois. Et sur ce qu'elle aimait = and on *the fact that* = ce que.

(To be continued.)

—o—

The Glass of Water; or, Cause and Effect.

(Comedy in Five Acts.)

LE VERRE D'EAU; OU, LES EFFETS ET LES CAUSES.

(Comédie en Cinq Actes.)

Scene II.—*(continued).*

Masham.

Ce n'est pas facile.	It is not an easy task.

Bolingbroke.

Non...car la force brutale et matérielle,	No, for brute physical force,
les succès emportés à coups de canon	successes secured with cannon
étourdissent tellement le vulgaire,	so much amaze the common herd,
qu'il ne lui vient jamais à l'idée	that it never entertains the idea
qu'un général vainqueur puisse être un sot,	that a victorious general may be a fool,
un tyran ou un fripon...	a tyrant, or a rogue...
et lord Marlborough en est un!	and Lord Marlborough is one!
je le prouverai..je le montrerai	I will prove it...I will show
glissant furtivement sa main victorieuse	his victorious hand slipping stealthily
dans les coffres de l'État.	into the treasures of the State.

Masham.

Ah! vous ne direz pas cela...	Ah! you will not say that...

Bolingbroke.

Je l'ai écrit...je l'ai signé...	I have written...and signed it...
l'article est là...il paraîtra aujourd'hui...	the article is ready...it will appear to-day.
je le répèterai demain,	I shall repeat it to-morrow,
après-demain..tous les jours..	after to-morrow..every day..
et il y a une voix qui finit toujours	and there is a voice which always succeeds
par se faire entendre,	in making itself heard,
une voix qui parle encore plus haut	a voice which speaks louder
que les clairons et les tambours...	than clarions and drums...
celle de la vérité!...	I mean the voice of truth!
Mais pardon...je me croyais au parlement,	But forgive me, I thought I was in the House of Commons,
et je vous fais subir un cours de politique,	and I inflict on you a political lecture,
à vous, mon jeune ami,	on you, my young friend,
qui avez bien d'autres rêves en tête...	who have very different dreams in your head...
des rêves de fortune et d'amour.	dreams of fortune and of love.

Masham.

Qui vous l'a dit?	Who told you so?

Bolingbroke.

Vous-même !...Je vois crois très-discret	Yourself!...I consider you very discreet
quand vous êtes éveillé ;	when you are awake ;
mais je vous préviens qu'en dormant	but I warn you that when you are asleep
vous ne l'êtes pas.	you are not so.

Masham.

Est-il possible ?	Is it possible ?

Bolingbroke.

Je vous ai entendu vous féliciter	I heard you congratulate yourself
en rêve de votre fortune,	in your dreams on your good fortune,
et vous pouvez me nommer	and you may tell me
sans crainte la grande dame	without fear the name of the great lady
à qui vous la devez.	to whom you owe it.

Masham.

Moi ?	I ?

Bolingbroke.

A moins que ce ne soit la mienne !...	Unless it is my wife !
auquel cas je ne vous demande rien ?...	In which case I ask you nothing !
je comprendrai...	I shall understand.

Masham.

Vous êtes dans l'erreur !	You are quite mistaken.
je ne connais pas de grande dame !	I know no great lady !
Il est quelqu'un, j'en conviens,	There is someone, I grant,
qui, sans se faire connaître,	who, without making himself known,
m'a servi de protecteur...	has protected me...
un ami de mon père...vous peut-être ?...	my father's friend...yourself perhaps ?

Bolingbroke.

Non, vraiment...	No, indeed.

Masham.

Vous êtes le seul cependant	You are, however, the only one
que je puisse soupçonner.	that I can think of.
Orphelin et sans fortune,	An orphan without fortune,
mais fils d'un brave gentilhomme	but the son of a worthy nobleman
tué sur le champ de bataille,	killed on the field of battle,
j'avais eu l'idée de demander	I had an idea of asking
une place dans la maison de la reine :	for a post in the Queen's household :
la difficulté était d'arriver à Sa Majesté,	the difficulty was to see her Majesty,
de lui présenter ma pétition ;	to present my petition ;
et un jour d'ouverture du parlement,	and on the day of the opening of Parliament,
je me lançai intrépidement	I rushed boldly
dans la foule qui entourait sa voiture ;	into the crowd which surrounded her carriage ;
j'y touchais presque	I had almost reached it
lorsqu'un grand monsieur,	when a tall gentleman,
heurté par moi, se retourne et,	against whom I had run, turned round and,
croyant avoir affaire à un écolier,	thinking he had to deal only with a scholar,
me donne sur le nez une chiquenaude.	gave me a fillip on the nose.

Bolingbroke.

Pas possible !	You don't say so !

Masham.

Oui, monsieur...je vois encore	Yes, sir, I see yet his
son air insolent, ricaneur...	insolent, sneering manner...
je le vois, je le reconnaîtrais entre mille,	I see him yet, I should recognise him among a thousand,
et si jamais je le rencontre...	and if ever I meet him...
Mais dans ce moment la foule,	But at that moment the crowd,
en nous séparant,	in separating us,
m'avait jeté contre la voiture de la reine	had thrown me against the Queen's carriage
à qui je remis ma pétition...	to whom I handed my petition...
elle resta quinze jours sans réponse.	it remained 15 days without a reply.
Enfin je reçois une lettre d'audience	At last I received a letter admitting me to an audience
de Sa Majesté !...	with her Majesty !...
Vous jugez si je me hâtai	You may fancy what haste I made
de me rendre au palais,	to present myself at the palace,
paré de mon mieux,	dressed in my best,
et à pied pour de bonnes raisons...	and on foot for very good reasons.
J'étais près d'arriver,	I was nearly there,
lorsqu'à deux pas de Saint-James,	when at two paces from St. James's,
et vis-à-vis d'un balcon	and opposite to a balcony
où se tenaient de belles dames de la cour,	where there were some beautiful ladies of the court,
un équipage, qui allait plus vite que moi,	a carriage, which was going faster than I was,
m'éclabousse de la tête aux pieds,	splashed me with mud from head to foot,
moi et mon pourpoint de satin,	both my person and satin doublet,
le seul dont je fusse propriétaire...	the only one that I possessed,
et pour comble de fatalité,	and to crown my misfortunes,
j'aperçois à la portière de la voiture...	I perceived at the carriage door,
ce même individu, l'homme à la chiquenaude...	this same individual, the man who had given me the fillip (snapped his fingers in my face)...
qui riait encore...	who was again laughing...
Ah ! dans ma rage, je m'élançai vers lui,	Ah ! in my rage, I darted after him,
mais l'équipage avait disparu,	but the carriage had disappeared,
et furieux, désespéré,	and furious and desperate
je rentrai à mon modeste hôtel,	I returned to my humble lodgings,
ayant manqué mon audience.	having missed my audience.

Bolingbroke.

Et votre fortune !	And your fortune !

Masham.

Au contraire ! je reçus le lendemain,	On the contrary ! Next day I received
d'une personne inconnue,	from an unknown person,
un riche habit de cour,	a rich court dress,
et, quelques jours après,	and, a few days afterwards,
la place que je demandais	the appointment which I had solicited
dans la maison de la reine.	in the Queen's household.
J'y étais à peine depuis trois mois,	I had scarcely had that appointment three months,
que j'avais reçu	when I received
ce que je désirais le plus au monde,	what I longed for the most in the world,
un brevet d'enseigne	an ensign's commission
dans le régiment des gardes.	in the Guards.

Bolingbroke.

En vérité ! Et vous n'avez aucun soupçon	Indeed ! And you have no idea
sur ce protecteur mystérieux ?	who this mysterious protector may be ?

Masham.	
Aucun !...il m'assure	None ! He assures me
de sa constante faveur,	of his constant favour,
si je continue à m'en rendre digne...	if I continue to make myself worthy of it...
Je ne demande pas mieux...	I ask nothing more...
ce qui me paraît seulement	the only thing that seems to me to be
gênant et ennuyeux...	inconvenient and troublesome
c'est qu'il me défend de me marier...	is that I am forbidden to marry.
Bolingbroke.	
Ah ! bah !	No ! really !
Masham.	
Craignant sans doute	Afraid, no doubt,
que cela ne nuise à mon avancement.	that that would be detrimental to my advancement.
Bolingbroke.	
[*riant.*	[*laughing.*
C'est là la seule idée	Is that the only idea
que cette défense ait fait naître en vous ?	that this prohibition has produced in your mind ?
Masham.	
Oui, sans doute.	Yes, undoubtedly !
Bolingbroke.	
[*de même.*	[*laughing.*
Eh bien ! mon cher ami,	Well ! my dear friend,
pour un ancien page de la reine	for an old page of the Queen
et pour un nouvel officier dans les gardes,	and a new officer in the Guards
vous êtes d'une innocence biblique...	you are of primitive (lit. Biblical) simplicity.
Masham.	
Comment cela ?	How so ?
Bolingbroke.	
[*de même.*	[*laughing.*
C'est que ce protecteur inconnu	Because this unknown protector
est une protectrice...	is a protectress.
Masham.	
Quelle idée !	What an idea !
Bolingbroke.	
Quelque grande dame,	Some great lady
qui vous porte intérêt...	who takes an interest in you.
Masham.	
Non, monsieur...	No, sir,
non, cela n'est pas possible !	that cannot be possible.

Translate into French the following sentences taken from the Verre d'Eau.

ACT I. SCENE II.

What is the matter (s'agir de)? The question is (s'agir de) to translate these sentences into French. If the question were to translate them into English—I have no objection. It will not break their heart (en mourir). I (thou, he, she, we, you, they) must have a book (say, il me faut un livre = there needs to me a book). I must do it now. I was compelled (me fallait) to do it. I shall be forced to do it. You should have (fallait) seen. You should (faudrait) see. You will have to dress yourself. We must have something to do. We still get the best of the bargain (y gagner). They must (devoir) be tired. How they must have (devoir) suffered. We have had (devoir) to pay. I am to (devoir) be there to-morrow. The country must (devoir) be beautiful. We think it our duty (devoir) to answer him. They were obliged (devoir) to go out. You ought to go out. They ought to have gone out. We *particularly wish* (tenir à) to go away. We *take an interest in* you. Whose is the victory? The question is to make the Parliament understand that. He was dressed in his best. Dost thou see it now (y être)? My father does not wish (avoir envie de) to leave them to me.

(To be continued.)

Quarterly Arithmetical Tests.

STANDARD I.—FIRST QUARTER.

1.	48	2.	340	4.	2 × 8;
	3		210		3 × 9;
	704				4 × 4;
	20	3.	198		5 × 6.
	325		14		

SECOND QUARTER.

1.	4	2.	703	4.	5 × 9;
	350		21		3 × 8;
	9				4 × 8;
	794	3.	453		6 × 5.
	30		428		

THIRD QUARTER.

1.	1	2.	204	4.	9 × 3;
	730		9*		2 × 7;
	713				10 × 2;
	45	3.	850		3 × 4.
	038		136*		

* To be dictated thus :—(1) Take 9 from 204. (2) Take 136 from 850.

STANDARD II.—FIRST QUARTER.

1. Add together 4, 3694, 72000, 302, and 17,570.
2. Take 3,724 from 21,360.
3. 3,027 × 12.
4. 18,050 × 28.

SECOND QUARTER.

1. 34,027 − 15,829.
2. 5,047 × 196.
3. 20,003 ÷ 6.
4. 45d. = 29d. = 100d. =

THIRD QUARTER.

1. How much less is 36 than 36,000?
2. 39,048 × 2,009.
3. 11,479 ÷ 12.
4. Three bags contain altogether 100 marbles, one has 14 and another 43; how many are there in the third?

STANDARD III.—FIRST QUARTER.

1. 370, 241, 806 ÷ 29.
2. Find the dividend when the divisor is 198 and the quotient 4,952.
3. 295,065 ÷ 387.
4. Add together 2s. 6d., 3½d., 7s. 4d., and 4¼d.

SECOND QUARTER.

1. How often is 59 contained in 837,005?
2. £20,002 6s. 9d. + £129 10s. 6½d. + £260 11s. 9¼d. + £50 16s. 3½d. + £9,132 0s. 6¼d.
3. From £900,006 14s. 2½d. take £9 2s. 3d.
4. £3,004 19s. 9½d. + £27 6s. 11¾d. + £80,726 14s. 3¼d. + £78 11s. 3½d. + £3 12s. 8½d. + £708 19s. 9¼d.

THIRD QUARTER.

1. Divide six million six hundred and six by 78.

2. Take three pence farthing from three hundred pounds.

3. £3,207 16s. 8¾d. + 3 half crowns + £59 6s. 0¼d. + £82,675 19s. 8¼d. + £27 15s. 11¾d. + £8,216 13s. 10½d. + £257 15s. 3½d.

4. A horse and carriage are worth £59 16s. 3d.; the carriage cost £14 19s. 8¼d.; what is the value of the horse?

STANDARD IV.—FIRST QUARTER.

1. £13,729 12s. 8¼d. × 12.
2. £789 10s. 9d. × 7,019.
3. £2,741 18s. 9½d. ÷ 11.
4. Multiply the difference between £119 12s. 1½d. and £109 11s. 6½d. by thirty-six.

SECOND QUARTER.

1. £7,900 10s. 0½d. ÷ 56.
2. If a man earn 15s. 9½d. in a week, what would he earn in 39 weeks?
3. Reduce 2 tons 14 cwt. to half ounces.
4. How many weeks are there in 7,649,851 minutes?

THIRD QUARTER.

1. £1,036,954 13s. 0½d. ÷ 609.
2. How often is 2s. 6d. contained in £5 10s.?
3. Reduce 33 acres 3 roods to sq. yds.
4. A boy takes 2 ft. 6 in. at a step, and walks 3 miles 4 fur. 170 yds.; how many steps does he take?

STANDARD V.—FIRST QUARTER.

1. 9,652 articles at £7 2s. 9½d. each.
2. What shall I have to pay for 1,329⅛ tons of sugar at £2 18s. 9¼d. per ton?
3. 12 bushels 2 pecks at £3 10s. 6d. per quarter.
4. What will be the cost of cutting 4 acres 3 roods 24 poles of grass at 6s. 7d. per acre?

SECOND QUARTER.

1. 78 sq. yds. 6 sq. ft. 96 sq. in. at 3s. 5½d. per sq. foot.

2. Bill:—2½ lbs. butter at 1s. 4d. per lb., 1½ lbs. cheese at 1s. 2d. per lb., 12 oz. lard at 10d. per lb., 2 doz. eggs at 8 for 1s, 2 turkeys' eggs at 3½d. each, 5 eggs at 1d. each.

3. Find the rent of a field for 3 years when £28 is paid for 8 weeks.

4. A man bought 3 lbs. 8 oz. of tea for 7s. 7d.; what would he pay for 2 cwt 1 qr. at the same rate?

THIRD QUARTER.

1. Take $\frac{1}{9} + \frac{1}{8}$ from $\frac{1}{2} + \frac{1}{3}$.

2. If the fare for 150 miles be 18s. 9d. how far can I travel for £6 1s. 10½d.?

3. Bill:—17 gal. @ 3½d. per pint, 4 doz. @ 1s. 9½d. each, 4 gross @ 9½d. per doz., 19 @ 6½d. each.

4. 27 acres 3 roods 25 poles at £1 8s. 8d. per acre.

STANDARD VI.—FIRST QUARTER.

1. Simplify $\dfrac{3\frac{1}{3} \text{ of } 5\frac{5}{8} \text{ of } 3\frac{5}{9}}{9\frac{3}{4} \text{ of } \frac{8}{33} \text{ of } 7\frac{1}{9}}$.

2. What number multiplied by $1\frac{3}{8}$ will produce $14\frac{3}{4}$?

3. Divide 1121·4 by ·534.

4. A. can do a piece of work in 4 days, and B. can do it in 6 days; in what time would they do it working together?

SECOND QUARTER.

1. Find the continued product of $\frac{17}{21}$, $\frac{126}{100}$, $\frac{4}{7}$ of $1\frac{2}{5}$, $\frac{95}{116}$ and $\frac{87}{133}$.

2. Multiply $\cdot 7\dot{5}7\dot{5}$ by $\cdot 36\dot{6}$.

3. Reduce 12s. $0\frac{3}{5}$d. to the dec. of half-a-guinea.

4. A. exchanged with B. 60 yds. of silk worth 7s. 3d. a yd. for 48 yds. of velvet; what was the price of a yard of velvet?

THIRD QUARTER.

1. Find the 4th proportional to the numbers 3, 3·75 and 40.

2. Simplify $\dfrac{2\frac{4}{11}}{2\cdot 6} \div \dfrac{2\frac{7}{11}}{8\cdot 7}$.

3. If the interest on £264 for 20 days be 10s. 9d. what is the rate per cent. per annum?

4. Reduce $\frac{4}{5}$ of $\frac{3}{7}$ of 7½d. to the fraction of half-a-guinea.

STANDARD VII.—FIRST QUARTER.

1. In a class of 25 children 19 attended during the week, 5 were present on 5 days, 6 on 4½ days, 3 on 4 days, 2 on 3½ days, 1 on 3 days, 1 on 2 days, and 1 on ½ day. Find the average number of days for each child in the class.

2. 23 per cent. of the population of a town of 30,000 people died in a year; find the number of deaths.

3. Simplify $\dfrac{1\frac{1}{4} - \frac{5}{12}}{1\frac{1}{4} + \frac{5}{12}} + \frac{7}{8} \text{ of } \dfrac{45}{42} - \dfrac{11\frac{1}{4}}{15}$.

4. A and B engage to do a piece of work for 30s. A could do it in 4 days, and B in 5 days; with the aid of C it is done in 2 days; how should they divide the money.

SECOND QUARTER.

1. In standard gold 22 parts out of 24 are pure gold, what percentage is dross?

2. A grocer used a weight which only weighs 15·75 ozs. instead of 1 lb., what per cent. does he gain by his dishonesty?

3. If 50 qrs. of wheat are sold at 77s. 8d. per qr. and 100 at 78s. 3d. per qr., what is the average price bushel?

4. Simplify $\dfrac{\frac{1}{2} + \frac{1}{4} + \frac{1}{6} + \frac{1}{8} + \frac{1}{10}}{\frac{1}{3} + \frac{1}{5} + \frac{1}{9} + \frac{1}{15}}$, and give the answer as a decimal.

THIRD QUARTER.

1. If 252 men dig a trench 210 yds. long, 3 wide, and 2 deep, in 5 days of 11 hrs. each, how many days of 9 hrs. each will 22 men require to dig a trench 420 yds. long, 5 wide, and 3 deep?

2. $\dfrac{\cdot375 \times \cdot375 - \cdot025 \times 0\cdot25}{\cdot375 - \cdot025}$.

3. What was the prime cost of an article which when sold for 12s. realised a profit of 20 per cent.?

4. Find the average of ·25, ·375, ·0125, ·36, and ·8.

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	1,100.	1,187.	2,427.
2.	130.	682.	195.
3.	184.	25.	714.
4.	16; 27; 16; 30.	45; 24; 32; 30.	29; 14; 20; 12.

STANDARD II.

	FIRST.	SECOND.
1.	93,570.	18,198.
2.	17,636.	989,212.
3.	36,324.	3,333 + 5.
4.	505,400.	3s. 9d.; 2s. 5d.; 8s. 4d.

THIRD.

1. 35,964.
2. 78,447,432.
3. 956 + 7.
4. 43 marbles.

STANDARD III.

	FIRST.	SECOND.
1.	12,766,958 + 24.	14,186 + 31.
2.	980,496.	£29,575 5s. 10$\frac{1}{2}$d.
3.	762 + 171.	£899,997 11s. 11$\frac{1}{2}$d.
4.	10s. 5$\frac{3}{4}$d.	£84,550 4s. 9$\frac{3}{4}$d.

THIRD.

1. 76,930 + 66.
2. £299 19s. 8$\frac{3}{4}$d.
3. £94,445 15s. 0$\frac{3}{4}$d.
4. £44 16s. 6$\frac{3}{4}$d.

STANDARD IV.

	FIRST.	SECOND.
1.	£164,755 12s. 3d.	£141 1s. 7$\frac{1}{4}$d. + 10.
2.	£5,441,763 14s. 3d.	£30 15s. 10$\frac{1}{2}$d.
3.	£249 5s. 4d. + 6.	193,536 half-ounces.
4.	£361 1s.	758 w. 6 d. 9 h. 31 m.

THIRD.

1. £1,702 14s. 4d. + 192.
2. 44 times.
3. 163,350 sq. yds.
4. 7,596 steps.

STANDARD V.—FIRST.

1. £68,911 5s. 2d.
2. £3,905 13s. 9$\frac{5}{32}$d.
3. £5 10s. 1$\frac{7}{8}$d.
4. £1 12s. 2$\frac{3}{4}$d.

SECOND.

1. £122 10s. 9$\frac{1}{2}$d.
2. 3s. 4d. + 1s. 9d. + 7$\frac{1}{2}$d. + 3s. + 7d. + 5d. = 9s. 8$\frac{1}{2}$d.
3. £546.
4. £27 6s.

THIRD.

1. $\frac{7}{18}$.
2. 975 miles.
3. £1 19s. 8d. + £4 6s. + £1 18s. + 10s. 3$\frac{1}{2}$d. = £8 13s. 11$\frac{1}{2}$d.
4. £39 11s. 11$\frac{3}{4}$d.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	3$\frac{2}{13}$.	$\frac{4}{5}$.	50.
2.	10$\frac{2}{11}$.	·2$\dot{7}$.	3.
3.	2,100.	1·1476190.	£3 14s. 3$\frac{3}{4}$d. $\frac{1}{35}$q.
4.	2$\frac{2}{5}$ days.	9s. 0$\frac{3}{4}$d.	$\frac{1}{48}$.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	3·06 days.	8$\frac{1}{3}$.	350.
2.	6,900.	1$\frac{17}{33}$.	$\frac{2}{5}$ or ·4.
3.	1.	9s. 9$\frac{1}{14}$d.	10s.
4.	A, 15s.; B, 12s.; C, 3s.	1·60546875.	·3575.

Pupil Teacher Examination Papers (Scotland).

31ST MARCH, 1888.

END OF FIRST YEAR.

FIRST PAPER.

(Two hours and a half allowed for this Paper.)

Grammar.

'I know *that* entertainments of *such* a nature are *apt* to raise dark and dismal *thoughts* in minds which are timorous; *but*, for *my own part*, though I am always serious, I do not know *what* it is to be *melancholy*.'

1. Analyse the above passage.
2. Parse fully the words in italics.

ANALYSIS.

SENTENCES	KIND	CONNECT.	SUBJECT	PREDICATE	OBJECT	EXTENSIONS
1. I know	Prin.		I	know	(2)	
2. that entertainments of such a nature are apt to raise dark and dismal thoughts in minds	Subord. noun to (1)	that	entertainments ……a nature	are apt	to raise…… thoughts (completion)	in minds (place)
3. which are timorous	Subord. adj. to (2)	which	which	are timorous		
4. but, for my own part, I do not know	Prin.	but	I	do not know	(5)	for my own part (reason)
5. what it is to be melancholy	Subord. noun to (4)	what	it—to be melancholy	is what		
6. though I am always serious	Subord. adv. of concession to (4)	though	I	am serious		always (time)

PARSING.

That—subord. conj., introd. noun sent.
such—indef. adj., qual. 'nature.'
apt—predic. adj., qual. 'entertainments.'
thoughts—com. noun, neut., plur., obj , gov. by 'to raise.'
but—co-ord. advers. conj., contrasting two complex sentences.
my own—comp. pronoun, possess. adj., qual. 'part.'
part—abstr. noun, neut., sing., obj., gov. by 'for.'
what—comp. rel. pron., equal to *that* + *which*, 'that' obj., gov. by 'do know' and 'which,' nom. after 'is,' in appos. with 'it.'
melancholy—predic. adj., qual. (one).

3. Distinguish between co-ordinate and subordinate conjunctions, and give a list of each class.

(3) Co-ordinate conjunctions join words or clauses and sentences which are independent of one another.

Subordinate conjunctions join clauses and sentences of which one is in a relation of dependence upon the other, or enters into its construction with the force of a noun, an adjective, or an adverb.

CO-ORDINATE CONJUNCTIONS.	SUBORDINATE CONJUNCTIONS.
And	That
But	As
Either—or	If
Neither—nor	Lest
Whether—or	Unless
Both—and	Though
	Although, &c.

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word 'Parenthetically.'

Write in small hand, as a specimen of copy-setting, the sentence 'In Saxon strength that Abbey frown'd.'

Arithmetic.

MALES.

1. Simplify $\dfrac{1\frac{2}{3} \text{ of } 1\frac{1}{4}}{3\frac{2}{3} + \dfrac{5}{1\frac{19}{41}}} + \dfrac{4}{5 + \dfrac{6}{7\frac{8}{9}}}$

$$\frac{1\frac{2}{3} \text{ of } 1\frac{1}{4}}{3\frac{2}{3} + \dfrac{5}{1\frac{19}{41}}} + \frac{4}{5 + \dfrac{6}{7\frac{8}{9}}} = \frac{\frac{5}{3} \times \frac{5}{4}}{\frac{11}{3} + \frac{41}{12}} + \frac{4}{5\frac{54}{71}}$$
$$= \frac{\frac{25}{12}}{\frac{85}{12}} + \frac{284}{409}$$
$$= \frac{5}{17} + \frac{284}{409}$$
$$= \frac{2045 + 4828}{6953} = \underline{\tfrac{6873}{6953}}. \text{ Ans.}$$

2. Express the difference between £$\frac{8}{15}$ and $\frac{5}{9}$ of a guinea as the fraction of half-a-crown.

$$\frac{\frac{5}{9}\text{ gui.} - £\frac{8}{15}}{2\frac{1}{2}\text{s.}} = \frac{11\frac{2}{3}\text{s.} - 10\frac{2}{3}\text{s.}}{2\frac{1}{2}\text{s.}}$$
$$= \frac{1}{2\frac{1}{2}} = \underline{\tfrac{2}{5}}. \text{ Ans.}$$

3. Find the value of ·525 of £6 6s. 8d. + ·0̇27̇ of £2 18s. 7d.

	£	s.	d.	
·525 of £$6\frac{1}{3}$ = $\dfrac{£19 \times ·525}{3}$	= 3	6	6	
·0̇27̇ of £2 18s. 7d. = £2 18s. 7d. × $\frac{1}{37}$	= 0	1	7	
	3	8	1	Ans.

4. A person has ·225 part of a mine; if he sells ·27̇ part of his share, what fractional part of the mine has he left?

(a) $·225 = \frac{225}{1000} = \frac{9}{40}$.
$·2\dot{7} = \frac{25}{90} = \frac{5}{18}$
(b) $\frac{5}{18}$ of $\frac{9}{40} = \frac{1}{16}$
(c) $\frac{9}{40} - \frac{1}{16} = \dfrac{18 - 5}{80} = \underline{\tfrac{13}{80}}$. Ans.

FEMALES.

1. Find by Practice the value of 6 tons 12 cwt. 91 lbs. at £32 6s. 8d. per ton.

	£	s.	d.	
	32	6	8	= value of 1 ton
			6	
	194	0	0	= ,, ,, 6 ,,
10 cwt. = $\frac{1}{2}$ of 1 ton	16	3	4	= ,, ,, 10 cwt.
2 ,, = $\frac{1}{5}$,, 10 cwt.	3	4	8	= ,, ,, 2 ,,
56 lbs. = $\frac{1}{4}$,, 2 ,,	0	16	2	= ,, ,, 56 lbs.
28 ,, = $\frac{1}{2}$,, 56 lbs.	0	8	1	= ,, ,, 28 ,,
7 ,, = $\frac{1}{4}$,, 28 ,,	0	2	$0\frac{1}{4}$	= ,, ,, 7 ,,
	214	14	$3\frac{1}{4}$	= ,, ,, 6 tons, &c. Ans.

2. Make out in proper form, and duly receipt the following bill:—

5 boxes tea, each 3½ cwt., at 2s. 9d. per lb.
84 lbs. coffee, at 1s. 10½d. per lb.
3 barrels sugar, each 4 cwt. 56 lbs., at £3 6s. 8d. per cwt.
17 stones butter, at 1s. 3d. per lb.

Edinburgh, 31st March, 1888.
Messrs. Maxwell and Millar,
Bought of James Boyd.

	£	s.	d.
To 5 boxes tea, each 3½ cwt., at 2s. 9d. per lb.	269	10	0
,, 84 lbs. coffee at 1s. 10½d. per lb.	7	17	6
,, 3 barrels sugar, each 4 cwt. 56 lbs., at £3 6s. 8d. per cwt.	45	0	0
,, 17 stones butter at 1s. 3d. per lb.	14	17	6
	337	5	0

Paid 31st March, 1888
James Boyd.

3. Define the *Least Common Multiple*: find the L.C.M. of 9, 13, 15, 52 and 63.

The smallest number which can be divided by two or more others without a remainder is called the *least common multiple* of those others.

$$\begin{array}{r|l} 3 & \cancel{9},\ \cancel{13},\ 15,\ 52,\ 63 \\ & \qquad\quad 5,\ 52,\ 21 \\ & \therefore \text{L.C.M.} = 21 \times 52 \times 5 \times 3 = \underline{16380}. \text{ Ans.} \end{array}$$

4. Simplify $\frac{4}{9} + (1\frac{1}{3} - \frac{7}{9}) - (\frac{1}{4} + \frac{1}{6}) + \frac{1}{2} - (\frac{1}{4} - \frac{1}{6})$.

$$\frac{4}{9} + (1\frac{3}{9} - \frac{7}{9}) - \left(\frac{6+4}{24}\right) + \frac{1}{2} - \left(\frac{6-4}{24}\right) =$$
$$(\frac{4}{9} + \frac{5}{9}) - (\frac{5}{12}) + \frac{6}{12} - \frac{1}{12} =$$
$$1 - \frac{5}{12} + \frac{5}{12} = \underline{1}. \text{ Ans.}$$

SECOND PAPER.

(*Two hours and a half allowed for this paper.*)

Geography.

1. Draw a map of Scotland, showing the mountains, rivers and capes.

2. Write a short account of Australia, under the heads of (*a*) climate, (*b*) productions, and (*c*) chief towns.

(2) Australia. (*a*) As the northern portion of this island-continent lies within the tropics, the climate is very hot, though the heat is tempered to some extent by the elevation of the land. The southern half has a temperature resembling that of Cape Colony, the average annual temperature of Melbourne being 60°. The interior is one of the most arid regions on the face of the globe. In winter the winds blow from the land to the sea, and in summer when the winds blow from the sea to the land the hot air retains as vapour such moisture as is not condensed on the edge of the plateau. Rains do occasionally fall in the interior in such quantity as to fill the watercourses; and this accounts for the possibility of bringing water to the surface in some places by means of artesian wells. The east coast strips are plentifully supplied with rain, and the monsoons bring it to the north and north-east, as in other tropical countries. North-west winds, corresponding to the south-west winds of Western Europe, bring rain to the south-west of Australia.

(*b*) The staple productions of Australia are gold, wool, and preserved meat. Gold was first discovered in 1851, and since then the country has been found to be rich in minerals of every kind. The colonists devote much attention to sheep-rearing, for which the vast extent and excellent quality of the pasture lands are well adapted.

(*c*) *Melbourne*, on the Yarra-Yarra, was founded in 1835 after the discovery of rich pastures in the neighbourhood of Port Philip Bay. It is the capital of Victoria. In the interior north-west of this town are *Ballarat* and *Sandhurst*, the former being the centre of the declining gold-digging region of Victoria, and the latter the growing centre of the region in which gold is obtained by the crushing of quartz. *Sydney*, capital of New South Wales, is the oldest city in Australia, and is beautifully situated on the magnificent harbour of Port Jackson. To the north is *Newcastle*, noted for coal, and *Bathurst* is in the interior. *Brisbane* is the capital of Queensland. *Adelaide*, capital of South Australia, is built on the only part of the coast where vessels have a safe basin in which to load alongside a wharf. *Perth* is the capital of West Australia.

3. Enumerate the varicus ways in which rivers originate, with illustrative examples.

A river may have its source—that is, its longest branch may originate—in (*a*) a spring, like the Jordan and the Danube; in (*b*) a lake, as the St. Lawrence, the Amazon, and probably the Nile; or in (*c*) a glacier, like the Rhone.

History.

1. Estimate the effect of the Roman rule in Britain upon the civilisation of the country. Mention the chief Roman remains which are still in existence in Britain.

(1) The Romans held the island as a military settlement in which the towns were mainly peopled by the conquerors, and the country was studded with the houses of the gentry and landholders of the ruling race. The Roman settlers brought with them the splendour, the refinement, and the practical genius which distinguished their civilisation. Agriculture was so far developed that Britain could export corn largely to the Continent. Marshes were drained, woods cut down and orchards planted. The youthful Britons were trained like Romans, and drafted off to serve in the armies.

Remains of Roman walls may still be seen at Chester, York, Chichester and Lincoln; at Caerleon (in South Wales) and at Bath were temples, theatres, and palaces. Even now in places once held by the Romans, the workman who digs below the surface comes on Roman pottery and tesselated pavements, and in our museums may be seen the pins of bronze with which the Roman ladies fastened their hair.

2. Give a short account of the circumstances which led to the Norman invasion of England, with the dates.

(2) About 1057 it is said that Harold was entrapped by William into the famous oath upon concealed bones of saints to the effect that he would assist William to obtain the English crown, and become a vassal for his earldom. Harold, however, gained popularity by successes which he gained over the Welsh, and by the action which he took in Northumbria against his brother Tostig. On the death of Edward the Confessor, 1066, he was by the Witenagemote elected king. Duke William, however, instantly demanded possession of the kingdom, to which Harold replied by a repudiation of the oath, and an assertion of his rights as conferred by the Witenagemote. Harold followed up the defiance by the expulsion from the realm of all the Norman nobles who had acquired land from Edward the Confessor and William promptly prepared for invasion.

Composition.

1. Write the substance of the passage read to you; or

2. Write a letter on 'Christmas,' or 'Keeping Pets.'

Edinburgh,
31st March, 1888.

Dear Sir,

The return of Christmas calls yearly for a new crop of sentiment. It has become quite a custom in Scotland to hold Christmas as our fellow-subjects the English do. In former times New Year's Day was the great Scotch holiday of the winter season, but it is now giving place to Christmas, which brings the family together for eating, drinking, and general festivity and congratulation. December 25th, generally accepted as the birthday of the Saviour, is gradually losing its sacred character, and becoming entirely a secular holiday. The houses are decked with a profusion of evergreens, and the literature of the season has a certain gorgeousness about it from the reward cards of the school to the brilliantly illuminated copies of favourite authors, and the pretty books of Kate Greenaway and other clever limners.

Holiday games, pies and plum-pudding make the festival pleasant to the young, and the elders live over again the yule-tide of former years in watching the merriment of the children. Christmas tales, coloured by superstition, are many, and the advent of the day bringing 'peace and good-will to man' is welcomed with chimes of bells, and, in the more primitive parts of England, by carol-singing.

These are but a few desultory ideas on the happy time of Christmas.

I am, dear Sir,
Yours faithfully,
WILLIAM TEACHER.

H. M. S., Esq,
Inspector of Schools.

Latin.

FIRST STAGE.

(*The answers to be written on a separate paper.*)

1. Give a list of words which take *ius* and *i* in the genitive and dative singular. Decline together *hoc numen* and *gravis orator.*

2. Translate and parse the following forms:—*rexerat*, *amatu*, *audienda*, *moneretur*, *fore*, *reget*.

3. Translate into English, and parse the words in *italics*:—
(*a*) *Claudite* portas *cives.*
(*b*) Boni magistri fideles servos *habent.*

OPTIONAL.

Translate into Latin:—
(*a*) Ye have heard the words of the wise man.
(*b*) The wolf is in the fields; the shepherds have been warned.

1. The following words take *ius* and *i* in the genitive and dative singular, viz.:—alius, uter, alter, alter-uter, uter-libet, utervis, unus, solus, totus, ullus, nullus, uterque, and neuter, ille, ipse, and iste.

	SINGULAR.		PLURAL.	
N.	Hoc	numen	Haec	numina
G.	Hujus	numinis	Horum	numinum
D.	Huic	numini	His	numinibus
A.	Hoc	numen	Haec	numina
Ab.	Hoc	numen	His	numinibus

	SINGULAR.		PLURAL.	
N.	Gravis	orator	Graves	oratores
G.	Gravis	oratoris	Gravium	oratorum
D.	Gravi	oratori	Gravibus	oratoribus
A.	Gravem	oratorem	Graves	oratores
V.	Gravis	orator	Graves	oratores
Ab.	Gravi	oratore	Gravibus	oratoribus

2. *Rexerat*—(he had ruled), 3rd pers., sing., plu-perf., indic. of a verb of the 3rd conj., *rego*, *rexi*, *rectum*, *regĕre.*
amatu—(to be loved), 2nd supine of a verb of 1st conj., *amo*, *amavi*, *amatum*, *amâre.*
audienda—(requiring to be heard), nom., sing., fem., gerundive of a verb of 4th conj., *audio -ivi -itum -ire.*
moneretur—(he should be advised), 3rd pers. sing., imperf., subj., pass. of a verb of 2nd conj., *moneo-ui-itum-ere.*
fore—(to be about to be), fut. inf. of the defect. verb, *forem.*
reget—(he shall rule), 3rd pers. sing., fut., indic. of a verb of 3rd conj., *rego*, *rexi*, *rectum*, *regere.*

TRANSLATION.

3. (*a*) Shut the gates, Citizens!
(*b*) Good masters have faithful servants.

PARSING.

Claudite—2nd pers., pl., pres., imper., verb, 3rd conj., *claudi-si-sum-ĕre.*
cives—voc., pl., com. noun, 3rd decl., civis-is.
habent—3rd pers., pl., pres., indic., verb, 2nd conj., *habeo-ui-itum-ēre.*

OPTIONAL.

(*a*) Vos audivistis verba sapientis.
(*b*) Lupus in agris est; pastores sunt moniti.

END OF SECOND YEAR.

FIRST PAPER.

(*Two hours and a half allowed for this paper.*)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word 'Parenthetically.'

Write in small hand, as a specimen of copy-setting, the sentence 'In Saxon strength that Abbey frown'd.'

Arithmetic.

MALES.

1. At what rate per cent. will £850 amount to £1,136 7s. 6d. in $7\frac{1}{2}$ years at simple interest?

£1,136 7s. 6d. − £850 = £286 7s. 6d.

$$\left.\begin{matrix}£850 & : & £100\\ 7\tfrac{1}{2}\text{ yrs.} & : & 1\text{ yr.}\end{matrix}\right\} :: £286\tfrac{3}{8} : \text{Rate}$$

$$£\frac{2291 \times 100 \times 1}{8 \times 7\frac{1}{2} \times 850} = £\frac{2291 \times 200}{8 \times 15 \times 850}$$

$$= \underline{4\tfrac{251}{510}\text{ p. c.}}\ \text{Ans.}$$

2. By selling goods for £817 19s. I lost 9 per cent.; at what price should I have sold them so as to have gained $10\frac{1}{2}$ per cent.?

$$£91 : £110\tfrac{1}{2} :: £817\ 19\text{s.} :$$

$$\frac{£817\ 19\text{s.} \times 221}{91 \times 2} = £\frac{16359 \times 221}{20 \times 91 \times 2}$$

$$= £\tfrac{278103}{280} = \underline{£993\ 4\text{s. } 6\text{d.}}\ \text{Ans.}$$

3. A person invests £500 in Indian Stock at $98\frac{7}{8}$, and sells out at $104\frac{1}{2}$; find his gain.

$$98\tfrac{7}{8} : 500 :: £5\tfrac{5}{8} : \text{Gain}$$

$$£\frac{45 \times 500 \times 8}{8 \times 791} = £\tfrac{22500}{791}$$

$$= \underline{£28\ 8\text{s. } 10\tfrac{634}{791}}.\ \text{Ans.}$$

FEMALES.

1. Simplify $\left(\frac{3\frac{1}{3}}{7} + \frac{2}{10\frac{1}{2}} - \frac{5}{6} \text{ of } \frac{4}{21}\right) \times 1\frac{3}{4}$.

$$\left(\tfrac{10}{21} + \tfrac{4}{21} - \tfrac{10}{63}\right) \times \tfrac{7}{4} = \frac{42 - 10}{63} \times \tfrac{7}{4}$$

$$= \frac{32 \times 7}{63 \times 4}$$

$$= \underline{\tfrac{8}{9}}.\ \text{Ans.}$$

2. Reduce $\frac{1}{10}$ of $9\frac{3}{4}$ acres to the fraction of 1 ac. 2 ro. 33 poles.

$$\frac{\frac{1}{10}\text{ of } 9\frac{3}{4}\text{ ac.}}{1\text{ ac. } 2\text{ ro. } 33\text{ pls.}} = \frac{\frac{1}{10}\text{ of } 1560\text{ pls.}}{273\text{ pls.}}$$

$$= \tfrac{156}{273}$$

$$= \underline{\tfrac{4}{7}}.\ \text{Ans.}$$

3. Explain the process of reducing a vulgar fraction to a decimal: reduce $\frac{3}{16}$, $\frac{3}{512}$, and $\frac{3}{70}$ to decimal fractions.

Rule.—If the vulgar fraction is in its lowest terms, place the decimal point after the numerator and affix ciphers, divide by the denominator as in division of decimals till there is no remainder, or until the figures repeat. Place a point in the quotient before as many figures as there are ciphers affixed to the numerator. We thus divide by as great a number as that by which we multiplied the dividend and so give the quotient its proper value.

$$\tfrac{3}{16} = \frac{3{\cdot}0000}{16} = \underline{{\cdot}1875}.$$

$$\tfrac{3}{512} = \frac{{\cdot}3{,}000{,}000{,}000}{512} = \underline{{\cdot}0005859375}$$

$$\tfrac{3}{70} = \frac{{\cdot}3000000}{7} = \underline{{\cdot}0428571}$$

4. If $\frac{3}{7}$ cwt. of coffee cost £3, at what price per lb. must it be sold to gain $\frac{1}{5}$ of the outlay?

$$\tfrac{1}{5}\text{ of the outlay} = 12\text{s.}$$

$$\therefore £3\ 12\text{s.} \div \tfrac{3}{7}\text{ of } 112 = \text{price required}$$

$$= \frac{72\text{s.}}{48}$$

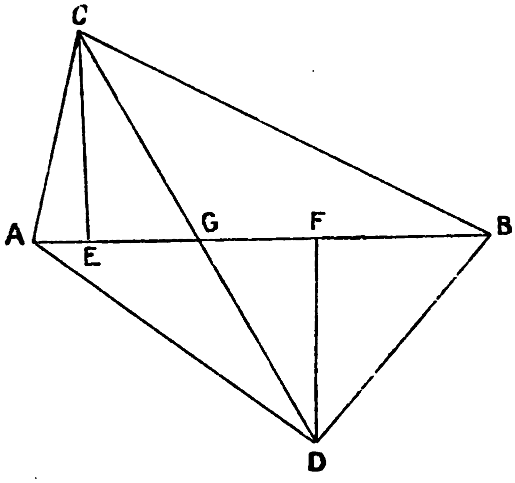
$$= \underline{1\text{s. } 6\text{d.}}\ \text{Ans.}$$

Euclid.

1. To describe a parallelogram which shall be equal to a given triangle, and have one of its angles equal to a given angle.

Book I., Prop. 42.

2. If two equal triangles be upon the same base, but on opposite sides of it, the straight line joining their vertices is bisected by the base.



Let the two equal triangles ACB, ADB be upon the same base AB but on opposite sides of it then the straight line CD joining their vertices will be bisected in the point G where CD is cut by the base AB.

Since the altitude of equal triangles (that is the perpendicular distance between the parallels) upon the same side or on opposite sides of the same base must be equal, then by letting fall the perps. DF, CE, upon the base AB, the side CE is equal to the side DF, the right angle CEG is equal to the right angle DFG; and the angles EGC, FGD are equal (I. 15). Therefore (I. 26) the triangles CEG, DFG are equal in every respect and the side CG, is equal to the side DG, and therefore CD is bisected in the point G. Q. E. D.

3. What is meant by *superposition*? Write the enunciations of any propositions in which this process is used.

By superposition is meant the placing of one figure upon another as a method of proving whether their corresponding parts coincide with one another. Bk. I. Props. 4 and 8 are examples of superposition.

Grammar.

'I have been studying *how* I *may* compare
This prison *where* I live unto the world;
And *for* because the world is populous
And here *is* not a creature *but* myself,
I cannot do it.'

1. Analyse the above passage.

2. Parse fully the words in italics.

ANALYSIS.

SENTENCE.	KIND	CONNECT.	SUBJECT	PREDICATE	COMPLETION	EXTENSIONS
1. I have been studying	Prin.		I	have been studying		
2. how I may compare this prison unto the world	subord. noun to (1)	how	I	may compare	this prison (dir. obj.) unto the world (indir. obj.)	
3. where I live	subord. adj. to (2)	where	I	live		where
4. and I cannot do it	Prin.	and	I	cannot do	it	
5. for because the world is populous	subord. adv. to (4)	for because	the world	is populous		
6. and (for because) here is not a creature but myself	(do.)	and (for because)	a creature but myself	(*a*) is not here; or, (*b*) is not		here

PARSING.

How—indir. interrog. adv. mod. 'may compare.'

may—aux. defect. verb (*may, might*), indic., pres., 1st pers., sing., agr. with subj. 'I.'

where—subord. conj. (= in which) introd. subord. adj. sent.

for—prep. forming part of the elliptical conj. phrase 'for because (that)'

is—subst. verb *am, was, been,* indic., pres., 3rd pers., sing., agr. with subj. 'creature.'

but—prep. relat. 'is not a creature' and 'myself.'

3. Explain the construction of the following sentences:—
   (*a*) He asked me where the boy lived.
   (*b*) The spot where the hero fell is marked by a monument.
   (*c*) I have sinned in that I have betrayed the innocent blood.

Sentence (*a*) is complex consisting of a principal clause 'He asked me,' and a subord. noun clause 'where the boy lived,' direct object of 'asked.'

(*b*) consists of a prin. clause. 'The spot is marked by a monument' and a subord. adj. clause 'where the hero fell,' qual. the subj. 'spot.'

(*c*) consists of a prin. cl. 'I have sinned,' and a subord. adv. cl. of reason 'in that I have shed innocent blood,' mod. the predicate 'have sinned.'

SECOND PAPER.

(*Three hours allowed for this paper.*)

Geography.

1. Draw a map of Italy, showing the mountains and rivers, and insert Rome, Naples, Florence, Venice, Milan, and Brindisi.

2. Give a short account of the chief products of the valley of the Ganges and of Ceylon respectively.

The valley of the Ganges by the overflowing of the river is rendered one of the most fertile regions of the globe. Of the stately trees one of the most valuable is teak, which rivals the oak in firmness and durability. Palm trees are the most noted of fruit-bearing trees. Rice, the chief food of the Hindoo, is the principal article of cultivation. Wheat, barley, millet and maize are also raised, besides the sugar-cane, the mulberry-tree, cotton, indigo, pepper and various kinds of delicious fruits. Attention is being given to the cultivation of the tea-plant which grows wild in Assam.

The soil of Ceylon is rich and luxuriant, producing coffee, sugar-cane, rice and pepper, with teak and other valuable woods. Plantations of cinnamon amid groves of cocoa-nut trees border the south-west coast for a hundred miles. The island abounds with gems, and there is an extensive pearl-fishery in the gulf of Manaar. The elephants of Ceylon are famed for their size and sagacity.

3. What is meant by a *degree of longitude*? What is its length in miles in Latitude 0° and Latitude 90°, respectively?

Circles are imagined as passing round the earth and through the poles. Each of these is divided into 360 intervals called degrees each of which subtends an angle of one degree (or $\frac{1}{90}$th of a right angle) at the centre of the earth.

A circle conceived as crossing these meridians (as they are called) at points 90° from each pole is called the *equator*. There is no natural starting point from which to measure longitude but it is now generally reckoned from the meridian passing through Greenwich Observatory. Longitude is measured by degrees which denote the angles which the planes of successive meridians make with one another. Since these meridians converge towards the poles and are most widely separate at the equator the distance covered by one degree of longitude diminishes continually as you approach the poles. Thus at the equator or latitude 0° it is rather more than 69 miles and at latitude 90° or at the pole it will be 0 miles.

History.

1. Give an account of the relations between Scotland and England during the reign of Edward I.

During the reign of Edward I. the throne of Scotland was claimed by several persons and the English king was asked to arbitrate between them. Claiming to be *overlord* he gave the throne to Baliol who after suffering much insult rebelled against his Lord Paramount. This led to the invasion of Scotland by Edward, who defeated the Scots and marched as far north as Elgin, exacting homage. Leaving the command to Surrey he returned to London. War soon broke out again and under the patriots Wallace and Bruce great progress was made towards the independence of Scotland. In 1306 the news that Bruce had been crowned at Scone roused the old 'Hammer of Scotland,' and he reached Carlisle, where he lay long on a sick bed. At Burgh-on-Sands his dying wish was that his bones should be carried at the head of the army till Scotland was subdued (1307).

2. Write short historical notes on Simon de Montford, Perkin Warbeck, and Cardinal Wolsey. Give in each case the leading dates.

Simon de Montford, Earl of Leicester, a Frenchman, married Eleanor, sister of Henry III. Headed the barons against the king and took him prisoner at Lewes, 1264. Formed the first House of Commons, 1265. Slain at Evesham, 1265.

Perkin Warbeck pretended to be the Duke of York, brother of Edward V. Encouraged by the Duchess of Burgundy and

James IV. of Scotland. Landed in Cornwall. Fled to Beaulieu Abbey. Surrendered on promise of life. Imprisoned in the Tower. Attempted to escape. Executed, 1499.

Cardinal Wolsey, born at Ipswich. Educated at Oxford. Appointed Dean of Lincoln, 1508; Bishop of Lincoln and Archbishop of York, 1514; Chancellor, 1515. Cardinal and Papal Legate, 1518. He lost all his offices except the See of York, 1529, and was arrested by orders of Henry VIII. Died on his way to London, 1530. Aged 59.

Composition.

Write a short essay on 'The sea,' or 'Glass.'

GLASS.

There are five or six kinds of glass which differ from one another not only in their use, but also in their composition and manner of manufacture. The glass for common windows is made by fusing together in a crucible at a very strong temperature, sand and soda, or sand and potash. For crown glass some saltpetre and lime are added to these ingredients. In order to give glass its proper shape and thickness for windows an iron tube is put into the molten glass and the lump which adheres to the end is blown into something like a big soap bubble. The place opposite to the blow-pipe is then opened and by whirling the blow-pipe round the hole opens and the bubble becomes a round and flat sheet. Sometimes the bubble is blown inside a wide smooth tube so as to form a hollow cylinder which is while soft laid open by a straight cut and flattened out. To make plate glass the pot of glass is emptied on a metallic table and rolled out by a metal roller. After cooling very slowly it is ground flat with sand and water, smoothed by grinding it with water and emery, and finely polished with iron-rust and water. The polishing is finished by rubbing two plates together, a little water and rust of tin being put between them. Crystal for salt-cellers, decanters, and 'cut' glass things generally contains some lead-rust.

SCHOOL MANAGEMENT.

Enumerate the qualities which should characterise the reading of a senior standard, and say what means should be adopted to cultivate each of them.

The qualities of good reading have been well sumned up in these two—intelligence and expression. Reading to be intelligent must bring out the sense of the passage read, and to be expressive the tones of the voice must be adapted to the sense so as to bring it out with the best effect. Expressive reading can be obtained only by uttering the words with purity and distinctness, the former having regard to the vowels and the latter to the consonants. These results can only be obtained by persevering correction of provincialisms which are nearly all violations of vowel sounds, and by careful attention in the younger classes as to distinct utterance of all consonants requiring to be sounded. Correct accent and emphasis must be insisted on, the former having to do with syllables and the latter with words. Emphasis depends on the reader's knowing the sense of the passage and may be cultivated by intelligent questioning on the part of the teacher, whereas accent being acquired by imitation depends entirely upon a good ear and careful correction when necessary. Besides these a deliberate style with fair modulation of voice may be looked for in a senior class. With careful watching in the lower classes good reading should now be pretty general in common schools, and with the introduction of two sets of reading books, fluency in reading should be no longer the exception. The reading of the pupils almost entirely depends on the teacher, who should endeavour to acquire for the imitation of the scholars a correct style.

Latin.

SECOND STAGE.

(The answers to be written on a separate paper.)

1. What verbs in Latin govern the accusative and genitive? Give examples.

Verbs of accusing (*accuso, arguo*), convicting (*convinco, coarguo*), condemning (*damno, condemno*), and acquitting (*absolvo, libero*) govern the accusative and genitive—as: accusit me furti—he accuses me of theft; aliquem sceleris arguere—to accuse one of a crime.

2. Give a list of the personal pronouns. Explain how *se* is used in Latin.

The personal or substantive pronouns are *ego*, I; *tu*, thou; *nos*, we; *vos*, you; what is sometimes called the pronoun of the 3rd person is a *reflective* pronoun, which occurs only in the oblique cases and is the same in both the singular and plural and for all genders:—G. sui, D. sibi, Acc. sē or sēsē, Ab. sē, or sese.

3. Give the imperative active, and the imperfect subjunctive passive of *facio*, *fero*, and *nolo*.

IMPERATIVE.

PRESENT.		FUTURE.	
Sing.	Plur.	Sing.	Plur.
Fac.	facite.	facito, facito.	facitote, faciunto.
Fer.	ferte.	ferto, ferto.	fertote, frunto.
Noli.	nolite.	nolito, nolito.	nolitote, nolunto.

IMPERFECT SUBJUNCTIVE PASSIVE.

Sing. Fierem, -es, -et.
Plur. Fieremus, -etis, -ent.
Sing. Ferrer, ferreris, ferretur.
Plur. Ferremur, ferremini, ferrentur.
'Nolo' has no passive voice.

4. Translate, parsing the words in italics:—
   (*a*) Non semper beatus est qui longa vita *fruitur.*
   (*b*) *Pepercisti victis* miseris *ignosce.*

TRANSLATION.

(*a*) He is not always a happy man who enjoys a long life.
(*b*) You have spared the conquered, pardon the wretched.

PARSING.

Fruitur—3rd pers., sing., subj. 'qui,' pres., indic., dep., 3rd conj. *fruor*, *fructus* or *fruitus*, *frui*, gov. abl. 'vita.'

Pepercisti—2nd pers., sing., subj. (tu), indic., perf. 3rd conj. *parco*, *peperci* or *parsi*, *parsum* or *parsitum*, *parcere*, gov. dat. 'victis.'

Victis—complete part. pass. dat. pl. verb, 3rd conj. *vinco*, *vici*, *victum*, *vincere.*

Ignosce—2nd pers., sing., subj. (tu), pres., imper., 3rd conj. *ignosco*, *-novi*, *-notum*, *-noscere*, gov. dat. 'miseris.'

5. Translate into Latin:—
   (*a*) It is pleasant to have a friend.
   (*b*) We ought not rashly to believe the words of the orator.

(*a*) Jucundum est amicum habere.
(*b*) Non temere credamus oratoris verbis oportet.

END OF THIRD YEAR.

FIRST PAPER.

(Two hours and a half allowed for this Paper.)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write, in large hand, as a specimen of copy-setting, the word 'Parenthetically.'

Write, in small hand, as a specimen of copy-setting, the sentence, 'In Saxon strength that Abbey frowned.'

Grammar.

'*Therefore* when the chiefs were removed, in order to go to the root, the whole *party was put* under a proscription so general and severe *as* to take their hard-earned bread from the lowest officers, in a manner which had never been known *before*, *even* in general revolutions.'

1. Analyse the above passage.

2. Parse the words in italics.

3. Point out the Latin prefixes in the passage, and give their exact force in each instance.

ANALYSIS.

SENTENCE	KIND	CONNECT.	SUBJECT	PREDICATE	OBJECT	EXTENSIONS
1. Therefore in order to go to the root the whole party was put under a proscription so general and severe as to take their hard-earned bread from the lowest officers in a manner	Principal		the whole party	was put under	a proscription so general and severe... manner	
2. when the chiefs were removed	subord. adv. to (1)	when	the chiefs	were removed		
3. which had never been known before even in general revolutions.	subord. adj. to 'manner' (3)	which	which	had been known		never (time) before (,,) even in general revolutions(place)

PARSING.

Therefore—adv. of consequence mod. 'was put.'
party—com. coll. noun, neut., sing., nom., subj. of 'was put.'
was—aux. verb of voice forming with past part.
put—intrans. verb, pass., indic., past, 3rd pers., sing., agr. with subj. 'party.'
as—abv. correl. with 'so,' forming part of the prep. phrase 'as to.'
before—adv. of time mod. 'had been known.'
even—adv. of deg. mod. the phrase 'in general revolutions.'

3. LATIN PREFIXES.

Prefix.	*Signification.*	*Word.*
re-	back	remove
pro-	for	proscription
re-	again	revolutions

Euclid.

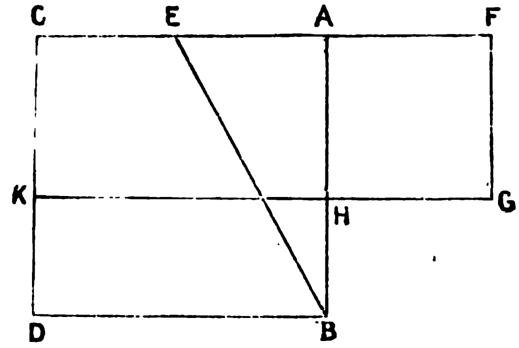
1. If one side of a triangle be produced, the exterior angle shall be greater than either of the interior opposite angles.

(Bk. I., Prop., 16.)

2. If a straight line be divided into any two parts, the squares on the whole line, and one of the parts, are equal to twice the rectangle contained by the whole and that part, together with the square on the other part.

(Bk. II., Prop. 7.)

3. To produce a given straight line so that the rectangle contained by the whole straight line thus produced, and the part produced, may be equal to the square on the given straight line.



Let AC be the given line. Bisect AC in E, upon CA describe the square CDBA. Join EB and produce CA to F making EF = EB. Then the rect. CF.FA is equal to the square on CA. Upon AF describe the square AFGH and produce GH to K.

Then because AC is bisected in E and produced to F, the rect. CF.FA together with the sq. on AE is equal to the sq. on EF, but EF = EB, ∴ rect. CF.FA together with the sq. on AE is equal to the sq. on EB. But sq. on EB = squares on BA and AE. Take away the common sq. on AE and the rect. CF.FA = sq. on AB, that is the sq. on CA the given line. ∴ The line CA has been produced to F so that the rect., &c.

Q. E. F.

Algebra and Mensuration.

1. Divide $10x^4 - 15y^4 - 48x^3y + 4xy^3 + 51x^2y^2$ by $4xy - 5x^2$

$$\begin{array}{r} \underline{(-2x^2+8xy-5y^2.} \quad \text{Ans.} \\ -5x^2+4xy+3y^2)\,10x^4-48x^3y+51x^2y^2+4xy^3-15y^4 \\ \underline{10x^4-\ 8x^3y-\ 6x^2y^2} \qquad\qquad\qquad \\ -40x^3y+57x^2y^2+\ 4xy^3 \qquad \\ \underline{-40x^3y-32x^2y^2+24xy^3} \qquad \\ 25x^2y^2-20xy^3-15y^4 \\ \underline{25x^2y^2-20xy^3-15y^4} \end{array}$$

2. Solve the following equation:—

$$\tfrac{1}{4}\left[1 + \tfrac{3}{2}(x + 2)\right] - \tfrac{2}{7}\left[1\tfrac{1}{3} - (1\tfrac{1}{2} - x)\right] = 1\tfrac{3}{28}.$$

$$\tfrac{1}{4}\left[1 + \tfrac{3}{2}(x + 2)\right] - \tfrac{2}{7}\left[1\tfrac{1}{3} - (1\tfrac{1}{2} - x)\right] = 1\tfrac{3}{28}$$

$$\tfrac{1}{4}\left[1 + \left(\frac{3x}{2} + 3\right)\right] - \tfrac{2}{7}\left[\tfrac{4}{3} - \tfrac{3}{2} + x\right] = \tfrac{31}{28}$$

$$7\left(4 + \frac{3x}{2}\right) - 8\left(x - \tfrac{1}{6}\right) = 31$$

$$28 + \frac{21x}{2} - 8x + \tfrac{8}{6} = 31$$

$$\begin{aligned} 168 + 63x - 48x + 8 &= 186 \\ 15x &= 186 - 8 - 168 \\ 15x &= 10 \\ x &= \underline{\tfrac{2}{3}}.\ \text{Ans.} \end{aligned}$$

3. The diagonal of a square measures 8 feet 4 inches; find its area in square yards, feet, and inches.

area of square = $(50\text{in.})^2 \times 2$
,, ,, = 5,000 sq. in.
,, ,, = 3 sq. yds. 7 sq. ft. 104 sq. in. Ans.

Arithmetic.

MALES.

1. A father left £1000 to be divided among his three children in proportion to their ages, which were 10, 25, 30 years, respectively. Find the share of each.

$$10 + 25 + 30 = 65.$$

$$\begin{array}{lllll} & & £ & \text{s.} & \text{d.} \\ \therefore \text{ the 1st gets } \frac{10}{65} \text{ of } £1000 & \text{or} & \underline{153} & \underline{16} & \underline{11\frac{1}{13}}. \text{ Ans.} \\ \text{,, 2nd ,, } \frac{25}{65} \text{ ,, ,,} & \text{or} & \underline{384} & \underline{12} & \underline{3\frac{9}{13}}. \text{ Ans.} \\ \text{,, 3rd ,, } \frac{30}{65} \text{ ,, ,,} & \text{or} & \underline{461} & \underline{10} & \underline{9\frac{3}{13}}. \text{ Ans.} \end{array}$$

2. From Inverness to Forres is 27 miles. If A start from Inverness and B from Forres at the same time, and walk to meet each other, where will they meet, B being the better walker by 15 per cent.?

(*a*) B does 115 miles while A does 100.

(*b*) ∴ they do 215 miles together in the same time when walking to meet each other.

(*c*) They will therefore meet at $\frac{115}{215}$ of 27 miles from Forres, as B will cover the larger part of the way.

$$\frac{115}{215} \text{ of } 27 = \frac{27 \text{ mls.} \times 115}{215} = \underline{14\tfrac{19}{43} \text{ miles from Forres.}} \text{ Ans.}$$

FEMALES.

1. Multiply $\cdot\dot{1}$ by $\cdot\dot{1}$ and express the result as a decimal.

$$\cdot\dot{1} \times \cdot\dot{1} = \tfrac{1}{9} \times \tfrac{1}{9} = \tfrac{1}{81}$$
$$= \underline{\cdot\dot{0}1234567\dot{9}}. \text{ Ans.}$$

2. Simplify $\dfrac{10{\cdot}01 - 8{\cdot}001}{6{\cdot}4 \div 4{\cdot}06}$ and express the result as a vulgar fraction.

$$\frac{10{\cdot}01 - 8{\cdot}001}{6{\cdot}4 \div 4{\cdot}06} = \frac{2{\cdot}009}{6\frac{2}{5} \div 4\frac{3}{50}}$$
$$= \frac{\frac{2009}{1000}}{\frac{32}{5} \times \frac{50}{203}}$$
$$= \frac{2009}{1000} \times \frac{5}{32} \times \frac{203}{50}$$
$$= \frac{407827}{320000} \text{ or } 1\tfrac{87827}{320000}.$$

3. Find the value of $3{\cdot}16$ of 8s. 4d. + $\cdot016$ of £2 2s. 8d. + $\cdot001$ of £1 3s. 4d. − $1{\cdot}\dot{3}$ of 1s.

$$\begin{array}{rrrl} & £ & \text{s.} & \text{d.} \\ 3{\cdot}16 \text{ of 8s. 4d.} = 100\text{d.} \times 3{\cdot}16 = & 1 & 6 & 4 \\ + \cdot016 \text{ of } £2 \text{ 2s. 8d.} = 512\text{d.} \times \frac{2}{125} = & 0 & 0 & 8\frac{24}{125} \\ + \cdot001 \text{ of } £1 \text{ 3s. 4d.} = 280\text{d.} \times \frac{1}{1000} = & 0 & 0 & 0\frac{7}{25} \\ \hline & 1 & 7 & 0\frac{59}{125} \\ - 1{\cdot}\dot{3} \text{ of 1s.} = \text{1s.} \times 1\frac{1}{3} = & & 1 & 4 \\ \hline & \underline{1} & \underline{5} & \underline{8\frac{59}{125}}. \text{ Ans.} \end{array}$$

4. A man's income is £741 2s. 6d., and his daily expenditure is a guinea and a half; how much did he save in 1885, when he had to pay an income tax of 8d. in the £?

$$\begin{array}{rll} \text{Total Income} = & \ldots\ldots\ldots\ldots\ldots\ldots & £741 \text{ 2s. 6d.} \\ \text{365 days at } £1 \text{ 11s. 6d.} = & £574 \text{ 17s. 6d.} & \\ £741\tfrac{1}{8} \text{ at 8d. per } £ = & \underline{£24 \text{ 14s. 1d.}} & \underline{£599 \text{ 11s. 7d.}} \\ \text{Amount saved} = & & \underline{£141 \text{ 10s. 11d.}} \text{ Ans.} \end{array}$$

SECOND PAPER.

(*Three hours allowed for this paper.*)

Geography.

1. Draw a map of Africa north of the equator, showing the rivers, and giving at least one degree of latitude and longitude.

2. Write short notes on the position and trade of the following places:—Port Said, The Congo, Sierra Leone, Cashmere, Smyrna, Singapore.

Port Said, a seaport of Egypt on the Mediterranean at the entrance to the Suez Canal, is the principal coaling station for steamers passing through the canal, and has a pier a mile and a half long.

The Congo, a great river of Central Africa, rises in the equatorial lake region and enters the Atlantic by an estuary six miles wide. The Congo region is said to be unrivalled as a field for colonization. At Punta de Lenha are numerous cotton-factories, the cloth being manufactured from the wild cotton, which grows in abundance, is of good quality, and easily separated from the seed. Great hopes are entertained that this river will become the great commercial route into the interior of Africa.

Sierra Leone is a West African colonial settlement belonging to Britain. When it became a British possession a hundred years ago a company was formed to make it a home for freed or refugee negroes. The climate is extremely unhealthy to Europeans.

Cashmere is a mountainous state in the north-west of India, having in the centre a small high-lying valley with a fine equable climate producing corn, wine, and silk, besides roses and other flowers innumerable.

Smyrna, on the west coast of Asia Minor, at the head of a deep inlet, is the last survivor of a number of seaports. A railway now proceeds from Smyrna inland as far as Alashehr, from which point the camel caravans start for the interior.

Singapore, on a small island at the extremity of the Malay peninsula, lying in the route from India to Australia as well as Eastern Asia, and hence the most important seat of marine commerce in Indo-China.

3. Show the effects of (*a*) the earth's rotation, and (*b*) the heat of the tropics, upon winds and ocean currents.

In order to obtain a clear notion of the nature and direction of winds it will be necessary to leave out of view the inequalities of the earth's surface. In tropical regions, where the vertical rays of the sun communicate a very great heat to the surface of the earth, the air in contact with this surface expands and rises through the higher stratum. Supported by this stratum it flows towards the nearest cold region, its place being meanwhile supplied by other currents proceeding from the adjacent cold regions. Hence we should expect that in the northern hemisphere winds *from* the north would prevail through the year, while in southern latitudes they would blow incessantly from the south. However, as the earth rotates on its axis from west to east every twenty-four hours its equatorial parts move at the rate of 1000 miles an hour while at the poles the surface remains at rest. Hence in passing from the higher latitudes towards the equator the cold currents of air arrive at regions of increased rotatory velocity. As they cannot keep pace with this increase of motion they necessarily lag behind and form currents flowing in a direction opposite to the rotation of the globe, or from *east* to *west*; and thus by the combined effects of the rotation of the globe and the difference of the temperature at its surface the northern and southern currents are deflected and modified so as to become respectively the permanent north-easterly and south-westerly *Trade Winds.*

Currents in the ocean depend upon the same causes as currents in the air. The waters within the tropics being greatly heated, evaporation to a considerable extent takes place. To supply the waste caused by evaporation, as well as to restore the equilibrium destroyed by the waters at the equator becoming heated, and therefore lighter, cold currents will flow from the north and south. Thus, as with winds, we might expect an equatorial current and return currents to the poles. The normal character of these currents must also be considerably modified by the distribution of land, though to a much greater extent than in the case of winds.

History.

1. Trace the fortunes of the House of Stuart from the Revolution of 1688 to the close of the Rebellion of 1745.

After being deposed (1688) James II. went over to Louis XIV., and in the following year by the help of a French fleet he invaded Ireland, to be finally defeated in the Battle of the Boyne, 1689. In 1692 a formidable attempt was made for the restoration of the Stuarts, but the fleet intended for the transport of the army was completely shattered off Cape La Hogue. When James II. died (1691) Louis acknowledged his son as king of Great Britain, and in 1708 great preparations were made by the French king at Dunkirk, but partly by dissension and partly by the vigilance of Admiral Byng the expedition was a failure.

On the death of Anne, who had been favourably disposed towards her half-brother, James, called the Old Pretender, declared his intention of claiming the throne, and accordingly his friends set up his standard at Braemar. The Pretender himself did not land in Scotland till after the battle of Sheriffmuir, and the surrender of Jacobite supporters at Preston. Landing at Peterhead he was met by the Earl of Mar, and he assumed the state of royalty. In a few weeks, however, he was compelled to leave the country, and embarked on board a French ship at Montrose. By the alliance between England and France James was forced to take refuge in Italy. He afterwards married Maria Clementina Sobieski, by whom he had two sons, Charles Edward, and Henry. During the latter part of his life he resided entirely at Rome, where he died, 1765.

Charles Edward, the Young Pretender, in 1743 attempted a fresh invasion, but the enterprise failed, and he withdrew to Paris till 1745, in which year he landed in the west of Scotland, and set up his standard at Glenfinnan, where he was joined by a number of Highland chieftains.

Eluding Sir John Cope he hurried towards Edinburgh, and on the way was joined by several nobles at Perth. Reaching Edinburgh he took up his residence in Holyrood Palace. Sir John Cope, having followed him, had drawn up his army at Prestonpans, and here the Highlanders surprised the Royalists and completely routed them.

In opposition to the advice of his council, Charles invaded England and reached Derby on his way to London. Forced to retreat, he returned to Scotland, and though successful in defeating General Hawley at Falkirk he continued his march northwards. At Culloden, 1746, he met the Royal forces under the Duke of Cumberland. His little army was utterly dispersed and he was forced to flee to the hills. After many romantic adventures he left Scotland never to return.

2. Give a short account of (*a*) the Act of Settlement, (*b*) the First Reform Bill, (*c*) the People's Charter.

The first Act of Settlement, 1689, settled the crown on William III. and Mary II. and their children, in default of which the crown was to go to Anne and her children. As William was childless and Anne's children all died young the second Act of Settlement, 1701, was passed, to secure a Protestant succession.

The First Reform Bill, 1832, redistributed the county franchise. Boroughs with less than 2,000 inhabitants were disfranchised, and no borough with less than 4,000 inhabitants could return two members. The franchise was given in boroughs and cities to all householders paying at least a yearly rent of £10, or, to vote for the county, of £50.

The 'People's Charter' was a document put forward in the beginning of the present reign by a set of men named Chartists, who demanded the following changes in the Constitution:—1. Universal suffrage. 2. Vote by ballot. 3. Annual Parliaments. 4. Payment of members of Parliament. 5. That every man should be eligible for a seat in Parliament. 6. That the country should be divided into electoral districts.

Composition.

Write a letter describing how you would begin a class in Geography, *or* on 'A house on fire.'

Glasgow,
28th April, 1888.

Sir,

In beginning a class in Geography my main object would be to gradually make them familiar with the meaning and use of maps, leading them to distinguish the various markings seen upon them. In order to do this I would present to them diagrams and models to illustrate geographical terms. For example, the model of an island might be shown, then a perspective representation of it, and finally a plan (or map) of it. If the same island can be pointed out on an ordinary map so much the better. Other islands should then be shown on the map, and their similarity commented upon. The definition of the term 'island' should then be got and put into a sentence to be committed to memory. In our school we have a very fine set of twelve pictures called 'Picturesque Geography,' which form a fine introduction to the meaning of river, sea, lake, island, &c. Drawing a plan of the school gives, perhaps, a clearer idea of a map than any other method; but I have seen the teacher, by covering a drawing-board with fine sand, illustrate the meaning of mountain, plateau, valley, plain, &c., in a very clear and interesting manner.

I am, Sir,
Your obedient servant,
Mary Hume.

H.M. Inspector, Esq.

School Management.

Draw up full notes of a lesson (specifying the age of the class for which it is intended) on *one* of the following subjects:—

(*a*) The complex sentence.
(*b*) The Trade Winds.
(*c*) Green (colour lesson for an infant class).

The Complex Sentence.

(*For Standard V.*; *age of pupils* 10—11.)

1. *Introduction.*—Recapitulation of lesson on simple sentence—subject—predicate—object—extension of predicate = adverb——distinction between *word*, *phrase* and *sentence* (*illustrate with copious exercises on black-board*).

2. *Second step.*—Sentences to be written on black-board as follows:—

(*a*) The teacher knew that the pupil could learn.
(*b*) The pupil that studies hard is sure to succeed.
(*c*) The teacher left when school was dismissed.

Draw from the class that (*a*) consists of two parts, an independent clause and a subordinate clause—the latter an object and equal to a noun, therefore a *noun clause*. Show that there are two predicates, and therefore two sentences, one depending on the other. In a similar manner let them see the adjective clause in (*b*), and the adverb clause in (*c*). (*Write, and ask for, similar sentences until the pupils are familiar with the form and composition of such sentences.*)

3. *Definition.*—A complex sentence consists of a principal clause (part, or sentence), and one or more subordinate clauses, which are of three kinds,—noun, adjective, or adverb clause.

4. *Analysis of Complex Sentence.*—Read over sentence—name the principal sentence—then the subordinate clauses telling whether noun, adjective, or adverb, with their relation to the principal sentence—and showing the connective. These sentences may also be analysed separately as simple sentences.

Latin.

THIRD STAGE.

(*Answers to be written on a separate paper.*)

1. Translate into English:—

(*a*) Dum ea conquiruntur et conferuntur, nocte intermissa circiter hominum millia VI. cjus pagi, qui Verbigenus appellatur sive timore *perterriti*, ne armis traditis supplicio adficerentur, sive spe salutis inducti, quod in tanta multitudine dediticiorum suam fugam aut occultari aut omnino ignorari posse existimarent, prima nocte e castris Helvetiorum *egressi* ad Rhenum finesque Germanorum contenderunt.

(*b*) Quod non fore *dicto* audientes neque signa laturi dicantur nihil se ea re commoveri: scire enim, quibuscumque exercitus dicto audiens non fuerit, aut male re *gesta* fortunam defuisse aut alique facinore comperto avaritiam esse convictam.

2. Parse fully the words in italics in the above passages.

Translation.

(*a*) While these things are being sought out and collected, night having intervened, about six thousand men of that canton which is called Verbigenus, either terrified by fear lest after their arms having been given up they should be visited with punishment, or induced, by the hope of safety, because they supposed that in so large a number of persons about to surrender their own flight could be either concealed or be altogether unknown, at the beginning of the night having gone forth from the camp of the Helvetii directed their course to the Rhine and the confines of the Germans.

(*b*) As to the soldiers being reported as not likely to obey the word of command, nor willing to carry forward the standards, that he was in no way disturbed by that circumstance, for he knew that those under whom an army would not be obedient to command, either fortune had deserted, on account of the unskilful conduct of some enterprise, or that in consequence of the discovery of some crime the charge of avarice had been fastened on them.

Parsing.

Perterriti—complete part., pass., nom., pl., mas., agr. with (homines) verb, 2nd conj. *perterreo,-ui,-itum,-ere.*
Egressi—complete part., nom., pl., mas., agr. with (homines) deponent verb, 3rd conj. *egredior, egressus, egredi.*
Dicto—dat., sing., neut., noun, 2nd decl. *dictum, -i,* gov. by *audientes* ('obeying').

3. Give a list of verbs and adjectives which govern the ablative case.

The adjectives governing the ablative are:—dignus, indignus, contentus, captus, fretus; also natus, satus, ortus, editus, and the like.

The verbs are utor, abutor, fruor, fungor, potior and vescor diquor, glorior, liberare nitor, nascor, creor, afficio, consto, and some others.

4. Translate into Latin:—

(*a*) When a great number of the soldiers had perished the rest laid down their arms.

(*b*) In almost all regions of the earth we have carried on war by sea and land.

(*c*) The citizens did not dare to enter the temple, for this was forbidden by the laws.

(*a*) Quum magnus militum numerus interiisset, reliqui arma sua posuerunt.

(*b*) In omnibus fere regionibus orbis, bellum terra marique gessimus.

(*c*) Cives inire in templum non ausi sunt quod hoc a legibus vetitum est.

(To be continued.)

How my School was Examined.

BY THE

HEAD MASTER OF A BOYS' SCHOOL.

STANDARD I.

Arithmetic.—The boys being divided alternately into sets *A* and *B*, the following sets of sums were dictated.

A. 1 694 + 307 + 980 + 46 + 798.
2 411 — 12.
3 600 — 591.

B. 1 768 + 437 + 15 + 909 + 67.
2 905 — 176.
3 896 — 203.

Answers.—*A.* (1) 2825; (2) 399; (3) 9. *B.* (1) 2196; (2) 729; (3) 693.

Dictation of words:—*Small, Finger, Branch, Table, Needle, Eyes, Cheese, Mother, Goose, Money.*

STANDARD II.

Arithmetic examined by means of following sums:—

A. 1 10,670 — 990.
2 86,010 ÷ 6.
3 17,011 ÷ 5.
4 69,089 × 970.

B. 1 6,901 — 1,087.
2 63,794 ÷ 8.
3 4,896 × 750.
4 68,375 × 68.

Answers.—*A.* (1) 9,680; (2) 14,335; (3) 3,402 + 1 over; (4) 67,016,330.

B. (1) 5,814; (2) 7,974 + 2; (3) 3,672,000; (4) 4,649,500.

Dictation.—'Just as they reached the worst part of the mountain one of them fell, and in falling he knocked down the person in front of him. The rope by which they were all bound together broke and four of the travellers when last seen by their friends were sliding downwards.'

Grammar.—The boys were required to make sentences with proper names; also to change nouns into pronouns. They were asked for gender, number, and person.

Geography.—The following are specimens of the questions asked.

What is a delta? How is a delta formed? Why is it called delta? (From the Greek letter *delta* Δ or D.)

When a river has not an island at its mouth, what is the mouth called? Mention any river that has an *estuary.*

When the tide meets the stream and causes the water to rise what is that called? (*Bore.*)

How do we know that the earth is round?

What is meant by the sea-beach?

What is the hollow called which a river makes for itself?

How do you know the right bank of a river?

What do you call the place where a tributary meets the river?

STANDARD III.

Arithmetic.—Specimen cards:—

A. 1. £16 0s. 1½d. + £900 17s. 0d. + £675 8s. 9¾d. and twenty-five guineas.

2. Find the difference between 3,006 farthings and 42,019 farthings, and write the answer in £ s. d.

3. Divide half a million by 19 times 194.

4. What would it cost to give 60 children each an apple, a pear, and a bun, if the apple cost a farthing, the pear a half-penny, and the bun a penny?

B. 1. £3,275 14s. 4d. + £7,006 12s. 0¾d. + 18s. 10½d. + £2,415 10s. 11d. + 9½d.

2. From £1,417 17s. 4¼d. take £14 17s. 0½d.

3. Divide 91,400 by 98.

4. I am paid four sums of 15s. 8d., 8s. 4d., 7s. 11d., and 1d. I divide the money equally among my four children. How much does each get?

Answers:—*A.* (1) £1,618 10s. 11¼d. (2) £40 12s. 9¼d. (3) 135 + $\frac{2390}{3686}$. (4) 8s. 9d.

B. (1) £12,698 16s. 11¾d. (2) £1,403 0s. 3¾d. (3) 932 + $\frac{64}{98}$. (4) 8s.

Dictation.—The following passage was given:—

'The queen was very sorry for her favourite, and if he had asked for mercy she would readily have granted it. She daily and hourly looked for him to send the ring, but the ring never came. The queen thought him proud and stubborn, and she became the same.'

Grammar.—The Inspector took all the parts of speech in this Standard, and was very particular with sentence-making. He required adverbs to be used in different ways, and questioned on the inflexions of nouns and pronouns.

Geography.—The boys were closely questioned on the district in which they lived, on the manufactures of England, on the exports and imports, on the chief towns and seaports, and on their trades. Questions were also asked on the basins of the Severn, Trent, and Thames, the Black Country, Glamorganshire, the Fen District, and Hampshire, and especially on places of historical interest and places noted for their scenery.

STANDARD IV.

Arithmetic.—*A.* 1. Multiply £6 16s. $4\frac{1}{4}$d. by 209.
2. Divide £3,689 3s. $1\frac{3}{4}$d. by 47.
3. Reduce 2 cwts. 0 qr. 15 lbs. to quarter ounces.
4. If a penny is 3 inches in circumference, how many times will it have rolled round along a path 1 pole 5 yds. long?

B. 1. Reduce 50,050 half-pence to pounds, shillings, and pence.
2. Multiply £439 6s. $9\frac{3}{4}$d. by 142.
3. How many ounces in 6 cwt. 2 qrs. 4 lbs.?
4. If a pigeon flies 54 miles an hour, how many yards will it fly in $3\frac{1}{2}$ hours?

C. 1. £8,700 0s. $7\frac{1}{4}$d. ÷ 29.
2. £489 11s. $7\frac{3}{4}$d. × 597.
3. How many half-pints in 54 gallons 1 quart 1 pint?
4. If a wall is 320 feet long and $11\frac{1}{2}$ feet high, find the surface.

Answers.—*A.* (1) £1,424 18s. $0\frac{1}{4}$d. (2) £78 9s. $10\frac{1}{4}$d. (3) 15296 qr. ozs. (4) 126 times.
B. (1) £104 5s. 5d. (2) £62,386 7s. $4\frac{1}{2}$d. (3) 11,712 ozs. (4) 45,440 yds.
C. (1) £300 0s. $0\frac{1}{4}$d. (2) £292,280 12s. $6\frac{3}{4}$d. (3) 870. (4) 408 sq. yds. 8 sq. ft.

Dictation.—'The youth was summoned, and informed that his plans had been accepted, and that the prize was his. The gentleman then said that he must put up the building; and his employer was so pleased with his success that he willingly gave him permission to go. The studious, painstaking carpenter became a great architect. He made a fortune, and rose high in public estimation.

STANDARD V.

Arithmetical cards were given containing the following among other questions:—
1. Find the value of 206 tons 7 cwt. at £3 4s. 7d. per ton.
2. Work the following $\frac{2}{5} + \frac{2}{3} - \frac{3}{4}$.
3. If a fourpenny loaf weighs 3 lbs. when wheat is 24s. per quarter, how much would it weigh when wheat is 30s. per quarter?
4. Find the cost of 1,001 chairs at 19s. $7\frac{1}{2}$d. each.
5. What must be added to $\frac{1}{2} + \frac{1}{5} + \frac{1}{6}$ to make 1?
Answers.—(1) £666 6s. $9\frac{1}{4}$d. (2) $\frac{19}{60}$. (3) 2 lbs. $6\frac{2}{5}$ ozs. (4) £982 4s. $7\frac{1}{2}$d. (5) $\frac{2}{15}$.
As an exercise in *composition* the boys were required to reproduce a short story which was told them twice by the Inspector.

Standards IV. and V. had the same sentences for grammatical exercises, parsing and analysis.
A. In August he always leaves England for warmer countries.
B. The soldier took a last fond look at the village church.
C. You yet may spy the fawn at play.

Geography was tested in these standards by questions on places of historical interest in Ireland, on the physical features of Australia and New Zealand, and interchange of production. Maps were drawn from memory.

STANDARD VI.

Arithmetic. A card:
1. If 63 lengths, each $1\frac{2}{9}$ inches long, are taken from 10 feet, how much is left?
2. If a man travels 66 ft. in a second, how long will it take him to travel 402 miles at the same rate?
3. Simplify (61·0089 + 17·001926 — ·018) × ·5.
4. If 1d. gains $1\frac{1}{2}$d. interest in 6 months, what is the gain per cent. per annum?
Answers.—(1) 3 ft. 7 in. (2) 8 hrs. 56 min. (3) 38·996413. (4) 300 per cent.

STANDARD VII.

Arithmetic.—A card:
1. A person who had spent $\frac{5}{6}$ of his money at one shop, and $\frac{1}{2}$ of the remainder at another, found he had £57 12s. left. How much had he at first?
2. Sound travels at the rate of 1,142 feet in a second. How far ought it to go in $5\frac{3}{4}$ seconds?
3. A man sells corn for £17 and loses 15 per cent. How much must he sell it for so as to gain 15 per cent.?
4. What is the average daily takings for six days on which £15 10s., £39 15s., £20, £17 9s. £15 17s. 2d., and £43 16s. are taken respectively?
Answers.—(1) £691 4s. (2) 1 m. 1 fur. 37 pls. 5 yds. 1 ft. (3) £23. (4) £25 7s. $10\frac{1}{3}$d.

Composition for Standards VI. and VII.
Write an Essay on—
A. Boating, or
B. A Fisherman's Life, or
C. An application for a situation.

Grammar for the same Standards was tested by analysis and parsing of the following sentences:—
A. I stooped and wrote upon the sand my name.
B. See that your letters are properly formed and lean one way.
C. Every substance through which light passes bends it more or less.

In all the upper Standards oral questioning was also given on word-building; for example, make other words from *actor*, *consider*, *arrange*, *conceive*, *sense*, *boy*, &c.

The upper Standards were questioned collectively on *Geography*, and maps were drawn from memory.

Practical Needlework in Elementary Schools.

BY MISS J. W. WARREN,

Inspectress of Needlework to the Leicester School Board.

IT is no easy task in these days to write on practical needlework. It is not a new subject; on the contrary, it is as old and time-honoured as any with which we are familiar, and the difficulty lies just in this fact—

nearly every woman will ridicule the idea that you can teach her more than she knows on such a generally accepted well-known theme. Now I venture at the onset to suggest that my articles are for those who do not know rather than the class referred to above. I will, therefore, without further preamble, address myself to teachers who, by reason of distance from educational centres, are willing to avail themselves of the excellent medium the PRACTICAL TEACHER affords.

My plan will be to write out a scheme workable from the babies' room through the whole school course, giving from time to time, where necessary, sheets of patterns, stitches and drills, and also advice as to suitable materials, apparatus, &c. The patterns will be in anticipation of a future rather than in consideration of a past, and in all cases taken direct from a garment, the worth of which has been proved. I shall keep close to Schedule III. and endeavour to give clear definite instruction by the way.

No mere theorist will ever be a good practical teacher of needlework. No amount of reading will make her a skilful needlewoman. Practice and nothing else in the world will bring about the desired result. Therefore, I say to one and every young teacher, try every specimen yourself before you attempt to teach it, do not deceive yourself with its apparent simplicity, believe me no ignorance is more fatal than that which excuses itself in this way. Even the elementary drills that accompany this month's issue should be gone through time after time, and the words committed to memory ere you bring them before your pupils. To put immature plans into execution is to insult child nature. And as I write on tried methods I confidently promise success in every case where practice accompanies the lessons.

Remember that needlework is a domestic *art*, and as such must have more time devoted to its practice than a mere intellectual lesson. Instruction should directly be followed or rather accompanied by doing, not even letting one day elapse. Test for yourself the advantages of the methods and materials suggested before you veto them, take a little trouble to get all things suitable for the teaching of so useful a subject. Remember that high, low, rich and poor alike agree that this at least is a necessary and useful part of a girl's education. All sympathy is with you and success is inevitable. If you will only be content to creep first and walk next, you shall in the end run. With these few opening remarks I proceed to the actual work of Schedule III.

'Below Standard I.=Infant Schools.—Needle drill; position drill; strips 18 in. by 2 in. in simple hemming, with coloured cottons, in the following order: 1st, black; 2nd, red; 3rd, blue.'

This is the work of the Infants' Department; it is certainly within the compass of every child born with a fair share of sense, but it is quite possible, and constantly proved, that children pass up to the girls' departments without even a fragment of this necessary preparation.

First begin with your babies. Make them by pleasant and suitable occupation quite *ready* to thread a needle and put on a thimble; no more, no less. Less is neglect, more, though possible, is dangerous and unsuitable.

Let them have beads, baby-threaders, and thimbles. These simple gifts will do all you want, and when they emerge from the baby-room you can, in a couple of months, teach three other drills, combined thread and thimble, position, and stitch drills.

Plan.—Buy a ball of coloured twine. Cut it into half-yard lengths, one for each child. Fasten at one end an ordinary shoe button. Provide also some large wooden beads of simple colours, I have used those from the number frame when it has been broken. Any kindergarten depôt will supply them; provide also per child a tin saucer, cost one halfpenny. Let each child have one or more beads in his saucer, and one piece of string. A quarter of an hour each day may be given, without fear of monotony, to this threading. See 'Bead-drill.'

These threading lessons admit of infinite variety by change of materials, stories, rhymes, &c., but to enter more fully into details would be to write on kindergarten rather than needlework. The youngest and newly admitted babies may join this drill, the beads are too large to get down their throats, or up their noses, or in their ears—hence their great value as a start. See Bead-drill, Sheet I.

Baby threaders are needles about three inches long devoid of points, about as thick as a 12 Bell gauge knitting pin, corresponding large eye—cost retail four pence a hundred. An excellent substitute is an ordinary tape needle, with the useful addition of two eyes, the twine as in bead drill, but with the added difficulty of two free ends. The babies may be put through the threader drill very soon after beginning the beads, indeed where difficulty is found in procuring the beads they might be substituted by threaders. See threader drill, Sheet I.

Though not mentioned in the schedule it is the custom in Infants' Schools to use a thimble drill. In the babies' room it makes a very useful variety, and is exceedingly popular because it admits of some noise which if rythmic is both pleasing and instructive.

Be careful in your selection of thimbles. Let them be of white metal 'Silver washed' as it is called. Fit up your little ones, take time and trouble with this, remember that to hurry education is at all stages ridiculous, but it is more absurd in a class of babies than elsewhere. While fitting chat constantly. Sometimes let the children fit themselves. I have seen girls content with a thimble too tight or too loose but never in schools remarkable for the excellence of their work; it is the direct outcome of a slovenly or irritable teacher. See thimble drill, Sheet I.

I think the babies' room may now be safely left. I am aware that this I suggest is very little, that work has been and continues to be done by these mites of humanity, but to put so exceedingly dangerous an instrument as a needle into the little untried hand is to enact a discipline that in itself is detrimental and wholly opposed to the principles of an enlightened experience. I prefer therefore to leave these feats of daring to those who have little or no knowledge of education, a very little soundly taught will produce results that may surprise even the one who imparts it. Next month I deal with the actual teaching of a stitch and the accompanying necessary sheet of drills.

SHEET I.

BEAD, THREADER, AND THIMBLE DRILLS.

BEAD THREADING DRILL.	BABY THREADER DRILL.	THIMBLE DRILL.
1. Pick up the thread (right hand).	1. Pick up thread (right hand).	1. Show right hand, spread fingers.
2. Point it nicely (left hand).	2. Sharpen point (left hand).	2. With thumb hold 1, 3, 4 fingers down.
3. Pick up a bead (left hand).	3. Pick threader up (left hand).	3. Pick thimble up (left hand).
4. Put hands together, rest 3rd and 4th fingers of right on knuckles of left.	4. Put hands together, 3rd and 4th fingers of right on knuckles of left.	4. Put thimble on finger.
5. Thread string through bead and hold bead with right hand.	5. Slip thread through eye and hold needle with left hand.	5. Hold it up to be seen.
6. Catch hold of short end with left hand.	6. Catch short end of thread in left hand.	6. Put both hands down or away.
NOTE.—Every teacher will know how to more clearly define these operations at first so that at last the mere number will suggest the part to be done. In threading No. 5, the bead is to be held quite still, the right hand being steadier guides the twine through.	NOTE.—The teacher must play with needle at end of drill, and on no account pick up needle first, beginners are very apt to do this if not taught a good method.	NOTE.—Talks on which finger, and tests of accuracy may be taken throughout, with songs, introducing tapping, jingling, drumming, &c.

No drill, however good, should continue for more than ten or fifteen minutes.

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,

Ex-President of the N.U.E.T.

IV.

There is one kind of essay in which pupil teachers and other students would do well to exercise themselves if they would attain facility in composition and all the advantage which the practice of it may bring them; it is the essay based on poetical ideas. Some subjects lend themselves very readily to this kind of treatment; among such may be named the Coming of Spring, the Blessing of Hope, Ideal Characters, Teachings of Legends and Fairy Tales.

An important element in essays of this class is the quotation of opinions of other writers, or of passages poetical or otherwise which serve to illustrate the subject and the essayist's views. There is an art in the use of quotations, and some of our eminent prose writers have distinguished themselves by the wonderfully apt manner in which they have introduced the words of their predecessors. Ease and skill in doing this demand of course that the writer shall have his mind well-stored with passages bearing on his subject and suitable for quotation. Where the conditions under which he writes admit of it, he should endeavour always to verify his quotations; but if, as in an examination, he is writing without access to books, he must rely on his memory; and it will be wise for him to give no quotation as exact unless he is quite sure of its being so.

In these papers, however, we have in view not only the student's task of writing a brief essay under stringent conditions of time, space, and entire self-dependence; but also that careful and persistent practice of writing without which readiness and skill cannot well be hoped for. It is for this reason that we have not confined our specimen essays to the meagre dimensions of those which can be produced in the few minutes a pupil teacher can devote to an essay, when the whole time available for a paper on several subjects is only two or three hours.

We would recommend that every pupil teacher and every student of English should make it a regular part of his course of study to write once a month, if not oftener, a careful essay on some subject such as he may have to deal with in his examinations or in the fulfilment of his duties.

We hope on some future occasion to give some examples of the very short essays which may be written in the examination time allowed to pupil teachers or to children in the higher standards. We propose to make the model essay of this month illustrative of our remarks on the use of quotation in dealing with the poetical aspect of a subject, and the subject we select is—

The Influence of Music.

In all ages and among all peoples of whom we have detailed knowledge the influence of music seems to have been generally felt and recognised. In proof of this we may refer to scripture, to mythology, to history, fable, legend and poetry, and also to our own individual experience.

In scripture we have a noteworthy instance of the powerful effect of music in the case of David's playing before Saul when the latter was attacked by his fits of madness. In the mythological fables of the Sirens and of Orpheus we have the influence of music treated hyperbolically as affecting not merely the minds of men, but the actions of beasts, and even having marvellous effect on inanimate nature. In the words of the famous Shakespearean song—

'Orpheus, with his lute, made trees,
And the mountain-tops which freeze,
Bow themselves, when he did sing.'

And in the parallel passage, so often mis-quoted, from Congreve's 'Mourning Bride,' the same idea is expressed—

'Music has charms to soothe a savage breast,
To soften rocks, or bend a knotted oak.'

In our early history we have read how the harping of King Alfred beguiled the Danes into negligence of their watch, and we have all heard memorable anecdotes of the influence of a pipe or a violin in charming wolves and other savage creatures into temporary harmlessness. The legend of the 'Pied Piper of Hamelin,' so wonderfully cast into verse by Robert Browning, will recur to the mind of every reader.

The poets seem never weary of dwelling on the enchantment that is wrought by music. The last lines of Shakespeare's song already quoted tell us

'In sweet music is such art,—
Killing care and grief of heart
Fall asleep, or, hearing, die.'

And Tennyson speaks of

'Music, which gentlier on the spirit lies,
Than tired eyelids upon tired eyes.'

Luther is recorded to have said 'Music is the art of the prophets, the only art that can *calm* the agitations of the soul.'

This soothing effect of music seems to be the favourite one with poets: but music does not only soothe. It also rouses and inspires. The soul may be not only 'lapped in soft Lydian airs,' but animated by trumpet blasts to deeds of heroic courage and patriotism. How often have the lays of the bards and minstrels with their wild snatches of song and thrilling accompaniments on the harp moved our Celtic forerunners to fight for their home! and how in later times have such strains as the March of the Men of Harlech, or the Marseillaise, or the Watch on the Rhine, or the pibroch of the Scotch, stirred men's hearts to fight madly for the cause which they severally symbolised!

In the chase and in the dance music plays an important part. To the latter indeed it may be considered indispensable, while its connection with the former is marked not only by the rousing horn but by such rare old songs as 'John Peel' and 'Old Towler.'

Again, the sublime strains of our modern sacred music seem to call forth and give expression to the highest forms of reverential worship. Who that has any ear or taste can listen to such music as Handel's Hallelujah Chorus, or Haydn's 'The Heavens are Telling,' or Mendelssohn's 'Thanks be to God,' and not feel lifted up in awe and adoration? Great Handel said that while composing the Hallelujah, it seemed to him as if 'he saw all heaven open before him, and the Great God himself!'

Indeed the inexhaustible combinations of melody, rhythm, and harmony, of force, speed, and expression, are capable of rendering every emotion of the soul, and so give rise to a correspondingly infinite variety of influence produced thereby.

It would be difficult to analyse the nature of this mysterious influence which is exercised by music. Carlyle says 'The meaning of song goes deep. Who is there that, in logical words, can express the effect music has on us? A kind of inarticulate, unfathomable speech, which leads us on to the edge of the infinite, and lets us for moments gaze into that!'

It may be that the law of order which lies at the root of all music and runs through every variety of it has much to do with its influence. It has at all events been distinctly recognised as an essential element in music that it should be based on law, and this has led to a sort of identification of orderly and harmonious movement with music. Hence the phrase 'Music of the spheres' and Shakespeare's lines

> 'There's not the smallest orb which thou behold'st,
> But in his motion like an angel sings,
> Still quiring to the young-eyed cherubims.'

Doubtless too there is a natural correspondence between sounds and our feelings, or, as Cowper puts it in his 'Winter Walk at Noon,'—

> 'There is in souls a sympathy with sounds,
> And as the mind is pitched the ear is pleased
> With melting airs or martial, brisk or grave.
> Some chord in unison with what we hear
> Is touched within us, and the heart replies.'

Another noteworthy feature in music is the persistency with which associations cling to particular tunes. Music has been spoken of as evanescent in its nature, but nothing is more apt to awaken memories of the scenes of far away, the events of long ago, than some song or tune that has made some strong impression upon us,—not even a painting which may almost realise a scene to the sight, or a description which laboriously depicts it for the understanding. What thoughts crowd on the mind of the Switzer or the Savoyard as he hears in a distant land one of his native Alpine songs! What recollections are brought to the mind of a Scot as he listens to the strains of 'Auld Lang Syne' or 'Scots wha hae,' or to a son of Erin by such melodies as 'The Minstrel Boy,' or 'The Harp that once through Tara's Halls!'

And how closely favourite tunes will cling to us, to cheer and help us on our way! Keble, in his 'Christian Year,' has a beautiful stanza embodying this thought.

> 'There are in this loud stunning tide
> Of human care and crime,
> With whom the melodies abide
> Of th' everlasting chime;
> Who carry music in their heart
> Through dusky lane and wrangling mart,
> Plying their daily task with busier feet,
> Because their secret souls a holy strain repeat.'

Rogers also refers to this clinging of music when, in his poem on Ginevra, he says of her picture—

> 'It haunts me still like some wild melody.'

And Coleridge in his Hymn to Mont Blanc, says

> 'Yet, like some sweet beguiling melody,
> So sweet we know not we are listening to it,
> Thou, the meanwhile, wast blending with my thought.'

We must not, however, proceed further in the task of attempting to analyse the power of music. It is, as we have said, difficult, perhaps impossible. But the character of that influence deserves a moment's consideration. Shakespeare puts into the mouth of Lorenzo the words,—

> 'The man that hath no music in himself,
> Nor is not moved by concord of sweet sounds,
> Is fit for treasons, stratagems, and spoils.'

But we must not suppose that music has no power except for good. It has been associated with dreadful deeds and degrading pleasures as well as high thoughts and noble enterprises: witness the tradition of Nero's fiddling during the burning of Rome.

What we should endeavour to do so far as our own influence may reach is to cultivate in ourselves and those about us a taste for the best music. The lofty strains of the great classical composers, our national songs, and such tasteful, pleasing music as Sir Arthur Sullivan and many living musicians have made popular can do no possible harm, but on the contrary are likely to have a refining and elevating tendency. They will afford healthy recreation and enable all who come under their influence to live happier and therefore more useful lives.

(*To be continued.*)

Query Column.

RULES.

1. Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.
2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.
3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**
4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.
5. Replies will not be sent through the post.
6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

⁂ All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.*

General.

1. A. H. H.—You should see who are the examiners and use their books among others if they have published works upon the subject. Bower and Vine's book is certainly excellent. Chara might certainly be expected; not the others you name. All necessary re-agents are provided.

2. AGRI.—You say you want 'Name of examiner in agriculture' and best text book for purpose of examination. Explain what examination you refer to and we will answer your query.

3. VIA.—It is intended that it should be, and most likely it will; else it would be practically useless.

4. A. S.—Phillip's Atlas contains maps of the British Empire. So does Johnston's. Both are very good. We think the book is about 4s. 6d. but you really don't need it. You need not write to publishers. A bookseller's collector knows where to go quite well. Longman is the publisher in the case you mention.

5. W. B.—Longman and Co. publish the essays. Your bookseller ought to be able to get them without any assistance. His agents must know quite well where to go. Have you two booksellers, try the other.

6. NAPIER.—(1) There is no man that fears you less than he fears you.

(2) There is no man that fears you less than he fears him.

(3) There is no man that I fear more than he does.

(4) There is no man that I fear more than I fear him,

7. PIERRE.—A good edition of Derrière les Haies is published by Hachette and Co., possibly of the other too. Both would be well annotated. We know of no editions with vocabularies. All Racine's works are translated and published by Bohn. You will hardly need translations.

8. J. H.—Ask exactly what you want to know and we will answer you. Your question is too general. Meantime get Hewett's Mother tongue, Lock's School Arithmetic, Todhunter's or C. Smith's Algebra (larger volumes), Langton's School Management. Dunstan's Manual of Music.

9. RECONNAISSANT.—Yes we think it would under good direction. You would not be likely to be able to do it for yourself. Such things can be done but time is always wasted and the best results rarely obtained.

10. SCOTCH.—Large hand. Froms of the letters not good, down strokes are too heavy, curves are not graceful. You bear too heavily upon the pen, 60. Small hand. The ink and pen seem to have been bad. The general forms of the letters need improvement. Steady practice of a good model for a few minutes a day for three months would no doubt produce a great change, 70.

11. LEON.—You should never assume you have passed till the fact is announced. You have done right to enquire at the office, if they won't tell you we cannot. It might be as well to wait another year. Your English Composition needs very great care. Be particular with the punctuation. Your note to us is very faulty in that matter. Thank you for your kind opinion. Bring the magazine under the notice of your friends.

12. W. SULSTON.—All students, unless prevented by illness, take the first year's papers at the end of the first year, and if they pass they are then allowed to take second year's papers at the end of the second year. If you did not pass in some of the first year's papers you would not be able to take some of the higher subjects in the second year. You cannot do as you like in the matter. You may assume that you must take the first year's papers at the end of the first year, and the second year's papers at the end of the second year.

13. DENTON.—Large hand 65, small hand 70. The writing is not above fair. The large hand letters are stiff, badly formed, and improperly joined. The letters m, n, e, s of the small hand are the worst. You are not restricted to one set of books. Imitate a good model and send another specimen. We should recommend Cowham's Mulhauser series. If you prefer Vere Foster's, use them.

14. ADMIRER.—No; if you say 80 you won't be right, but you won't be far wrong.

15. FABIOLA.—Twisden's 'Theoretical Mechanics,' Deschanel's 'Light, Sound, and Heat,' or 'Light and Sound,' and Garnett's 'Heat.' Mother tongue is native tongue. For us it is English; for a Frenchman it is French. You are not right; it is not the baby language which a child first picks up.

16. SIOPWR MAWR.—(*a.*) For July. (*b.*) You must send the question. (*c.*) Most likely in June.

17. JOSEPH BELL.—From micrometrical measures of the lengths of the shadows of the most conspicuous of the mountains of the moon, taken under the most favourable circumstances, the heights of many of them have been calculated.

18. L. R. W.—If $2a'$, $2a''$ be the inclination of two radii of a circle $x^2 + z^2 = r^2$ to the axis of x, find the equation to the chord joining the extremities of the radii. (*Puckle.*)

Let x_1, z_1 be the co-ordinates of the extremity of one of the radii,

And let x_2, z_2 be the co-ordinates of the extremity of the other radius;

$$\text{Then, } x_1 = r\cos 2a',\ z_1 = r\sin 2a';$$
$$x_2 = r\cos 2a'',\ z_2 = r\sin 2a''.$$

Equation to the straight line passing through the points x_1, z_1 and x_2, z_2 is :—

$$(z - z_1)(x_2 - x_1) = (x - x_1)(z_2 - z_1);$$

∴ Equation to the line is :—

$$\begin{aligned}
&(z - r\sin 2a')(r\cos 2a'' - r\cos 2a') \\
&\qquad = (x - r\cos 2a')(r\sin 2a'' - r\sin 2a') \\
&z(\cos 2a'' - \cos 2a') - r\sin 2a'(\cos 2a'' - \cos 2a') \\
&\qquad = x(\sin 2a'' - \sin 2a') \\
&\qquad\qquad - r\cos 2a'(\sin 2a'' - \sin 2a') \quad \therefore \\
&x(\sin 2a' - \sin 2a'') + z(\cos 2a'' - \cos 2a') \\
&\qquad = r(\sin 2a'\cos 2a'' - \sin 2a''\cos 2a') \\
&2x\sin(a' - a'')\cos(a' + a'') + 2z\sin(a' - a'')\sin(a' + a'') \\
&\qquad = r\sin(2a' - 2a'') \\
&\qquad = 2r\sin(a' - a'')(\cos a' - a'')
\end{aligned}$$

Dividing by $2\sin(a' - a'')$]

$$\begin{aligned}
x\cos(a' + a'') + z\sin(a' + a'') &= r\cos(a' - a'') \\
&= r\cos(a'' - a').
\end{aligned}$$

Arithmetic.

1. FOLKESTONIAN.—The successful candidate at an election polled $\frac{3}{5}$ of the voters, and had a majority of 756 over his rival, $\frac{1}{9}$ of the constituency remaining unpolled. Required the number that voted for each candidate, and gross number of electors.

$$\begin{aligned}
\text{Number for successful candidate} &= \tfrac{3}{5} \text{ of electors,} \\
\text{,, unsuccessful ,,} &= (\tfrac{8}{9} - \tfrac{3}{5}) \text{ of electors} \\
&= \frac{40 - 27}{45} \quad \text{,,} \\
&= \tfrac{13}{45} \quad \text{,,} \quad ;
\end{aligned}$$

$$\begin{aligned}
\therefore \text{Difference} &= (\tfrac{3}{5} - \tfrac{13}{45}) \text{ of electors} \\
&= \frac{27 - 13}{45} \quad \text{,,} \\
&= \tfrac{14}{45} \quad \text{,,} \quad ;
\end{aligned}$$

$$\therefore \tfrac{14}{45} \text{ of electors} = 756,$$

$$\begin{aligned}
\therefore \text{Number of electors} &= \overset{54}{\cancel{756}} \times \frac{45}{\cancel{14}} \\
&= 2{,}430.
\end{aligned}$$

$$\begin{aligned}
\text{Number for successful candidate} &= \tfrac{3}{5} \text{ of } 2{,}430 \\
&= 486 \times 3 \\
&= 1{,}458; \\
\text{,, unsuccessful ,,} &= 1{,}458 - 756 \\
&= \underline{702.}
\end{aligned}$$

2. RHONDDA.—A vessel is full of a mixture of a spirit and water, in which there is found to be 17 per cent. by measure of spirit. Ten gallons are drawn off, and the vessel is filled up with water. The proportion of spirit is now found to be $15\frac{1}{9}$ per cent. How much does the vessel hold?

$$\begin{aligned}
\text{Quantity of spirit drawn off} &= 17\ \% \text{ of 10 gals.} \\
&= \tfrac{17}{100} \text{ of 10 gals.} \\
&= \tfrac{17}{10} \text{ gals.};
\end{aligned}$$

$$\begin{aligned}
\therefore (17\,\% - 15\tfrac{1}{9}\,\%) \text{ of contents} &= \tfrac{17}{10} \text{ gals.,} \\
1\tfrac{8}{9}\,\% \text{ of contents} &= \tfrac{17}{10} \text{ gals.,} \\
\tfrac{17}{900} \text{ of contents} &= \tfrac{17}{10} \text{ gals.} \\
\therefore \text{Contents} &= \left(\frac{\cancel{17}}{1\cancel{0}} \times \frac{90\cancel{0}}{\cancel{17}}\right) \text{ gals.} \\
&= \underline{90 \text{ gals.}} \text{ Ans.}
\end{aligned}$$

3. NITOR.—A vat contains 900 gallons of methylated spirits to which 9 °/ₒ too little naphtha has been added; how much naphtha must be added to bring the mixture to the legal standard, which is 10 °/ₒ of naphtha?

Quantity of naphtha at first $= 1$ °/ₒ of 900 gals.
$= 9$ gals.;
∴ Quantity to be added + 9 gals.
$= 10$ °/ₒ (900 gals. + Quantity to be added)
$= \frac{1}{10}$ (900 gals. + Quantity)
$= 90$ gals. $+ \frac{1}{10}$ Quantity,
Quantity $- \frac{1}{10}$ Quantity $= 90$ gals. $- 9$ gals.
$\frac{9}{10}$ Quantity $= 81$ gals.,
∴ Quantity $= 81$ gals. $\times \frac{10}{9}$
$= \underline{90 \text{ gals.}}$ Ans.

Or—

$$\overset{\text{gals.}}{(100 - 10)} : \overset{\text{gals.}}{(900 - 9)} :: \overset{\text{gals.}}{10} : \text{Total quantity of naphtha.}$$

$$\overset{\text{gals.}}{\cancel{90}} : \underset{99}{\overset{\text{gals.}}{\cancel{891}}} :: \overset{\text{gals.}}{1\cancel{0}} : \text{Total quantity.}$$

$= 99$ gals.

∴ Quantity of naphtha to be added
$= 99$ gals. $- 9$ gals.
$= \underline{90 \text{ gals.}}$ Ans.

4. LEARNER.—Find the G.C.M. of 3,116,295 and 9,883,705 only once dividing. (*Marlborough Arithmetic.*)

3116295)9883705(3
$\underline{9348885}$
$\underline{534820}$

The G.C.M. of the two numbers will measure their sum.

3,116,295 + 9,883,705
= 13,000,000;

And 13 will measure 534,820; and 5 is the only measure in addition common to the two numbers and their sum;

∴ G.C.M. $= 13 \times 5$
$= \underline{65}$. Ans.

Algebra.

1. UDGORN.—Solve:—

$$\left.\begin{aligned} (b + c)(x + c - b) + a(y + a) &= 2a^2 \\ \frac{ay}{(b - c)x} &= \frac{(b + c)^2}{a^2} \end{aligned}\right\}$$

(*Hamblin Smith.*)

$$\left.\begin{aligned} (1)\quad (b + c)(x + c - b) + a(y + a) &= 2a^2 \\ (2)\quad \frac{ay}{(b - c)x} &= \frac{(b + c)^2}{a^2} \end{aligned}\right\}$$

$$\begin{aligned} (1)\quad (b + c)x + (b + c)(c - b) + ay + a^2 &= 2a^2 \\ (b + c)x - (b + c)(b - c) + ay &= a^2 \\ (b + c)x + ay &= a^2 + b^2 - c^2. \end{aligned}$$

$$\begin{aligned} (2)\quad a^2y &= x(b - c)(b + c)^2 \\ x(b^2 - c^2)(b + c) - a^2y &= 0. \end{aligned}$$

$$\left.\begin{aligned} (1)\quad (b + c)x + ay &= a^2 + b^2 - c^2 \\ (2)\quad (b + c)(b^2 - c^2)x - a^2y &= 0 \end{aligned}\right\}$$

$$\left.\begin{aligned} (1)\quad a^2(b + c)x + a^3y &= a^2(a^2 + b^2 - c^2) \\ (2)\quad (b + c)(b^2 - c^2)x - a^3y &= 0 \end{aligned}\right\}$$

$$\begin{aligned} \text{Adding]}\ a^2(b + c)x + (b + c)(b^2 - c^2)x &= a^2(a^2 + b^2 - c^2) \\ (b + c)(a^2 + b^2 - c^2)x &= a^2(a^2 + b^2 - c^2) \\ (b + c)x &= a^2 \\ \therefore x &= \frac{a^2}{b + c}. \end{aligned}$$

$$\begin{aligned} (2)\quad a^2y &= x(b - c)(b + c)^2 \\ &= (b - c)(b + c)^2 \times \frac{a^2}{b + c} \\ &= a^2(b - c)(b + c) \\ &= a^2(b^2 - c^2) \\ \therefore y &= \frac{b^2 - c^2}{a}. \end{aligned}$$

2. JEAN.—A bag contains five coins, and it is known that they can be nothing but shillings or sovereigns; two shillings are drawn out together, and are not replaced. Determine the value of another draw of two coins. Give full explanation.

There are four hypotheses with respect to the coins to be regarded as equally probable before the observed event. (1) 5 shillings. (2) 4 shillings and 1 sovereign. (3) 3 shillings and 2 sovereigns. (4) 2 shillings and 3 sovereigns.

The probability of the observed event on these hypotheses is respectively:—

$$1,\ \tfrac{4}{5} \times \tfrac{3}{4},\ \tfrac{3}{5} \times \tfrac{1}{2},\ \tfrac{2}{5} \times \tfrac{1}{4}$$
$$= 1,\ \tfrac{6}{10},\ \tfrac{3}{10},\ \tfrac{1}{10}.$$

Hence after the observed event the probabilities of the hypotheses are respectively:—

$$\tfrac{10}{20},\ \tfrac{6}{20},\ \tfrac{3}{20},\ \tfrac{1}{20}.$$

Now on the first hypothesis there are 3 shillings left in the bag, and the value of a draw is therefore two shillings.

On the second hypothesis there are 2 shillings and one sovereign left in the bag, and the value of a draw is

$$\frac{2 + (2 \times 21)}{3}\text{s.} = \tfrac{44}{3}\text{s.}$$

On the third hypothesis there are 1 shilling and 2 sovereigns left in the bag, and the value of a draw is

$$\frac{(2 \times 20) + (2 \times 21)}{3}\text{s.} = \tfrac{82}{3}\text{s.}$$

On the last hypothesis there are 3 sovereigns left in the bag, and the value of a draw is 40 shillings.

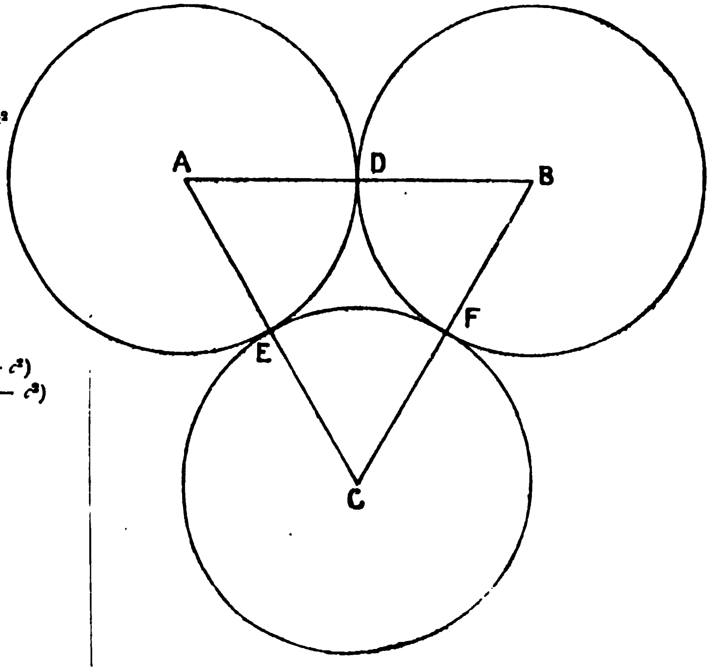
Hence the whole value of another draw

$$= \left[\left(\tfrac{10}{20} \times 2\right) + \left(\frac{\overset{2}{\cancel{6}}}{\underset{5}{\cancel{20}}} \times \frac{\overset{11}{\cancel{44}}}{\cancel{3}}\right) + \left(\frac{\cancel{3}}{\underset{10}{\cancel{20}}} \times \frac{\overset{41}{\cancel{82}}}{\cancel{3}}\right) + \left(\tfrac{1}{20} \times 40\right)\right]\text{s.}$$
$$= \left(1 + \tfrac{22}{5} + \tfrac{41}{10} + 2\right)\text{s.}$$
$$= \left(3 + 4\tfrac{2}{5} + 4\tfrac{1}{10}\right)\text{s.}$$
$$= 11\tfrac{1}{2}\text{s.}$$

$= \underline{11\text{s. } 6\text{d.}}$ Ans.

Mensuration.

1. JOHN BULL.—Six equal circles of radius *a* are placed so that each touches two others, their centres being all on the circumference of a circle; find the area which they enclose.



Area enclosed = Area of circle of radius a + 6 times area of space DEF;

Area of DEF = Area of equilateral triangle ABC – 3 times area of ADE

= Area of equilateral triangle of side $2a$ – 3 times $\frac{1}{3}$ area of circle of radius a

= Area of triangle of base $2a$ and perpendicular height $a\sqrt{3}$ – $\frac{1}{2}$ area of circle of radius a

$$= a^2\sqrt{3} - (\tfrac{1}{2}a^2 \times \tfrac{22}{7})$$

$$= a^2\sqrt{3} - \frac{11a^2}{7}$$

$$= a^2(\sqrt{3} - \tfrac{11}{7});$$

$$\therefore \text{Area enclosed} = a^2 \times \tfrac{22}{7} + 6a^2(\sqrt{3} - \tfrac{11}{7})$$

$$= a^2(\tfrac{22}{7} + 6\sqrt{3} - \tfrac{66}{7})$$

$$= a^2(6\sqrt{3} - \tfrac{44}{7}).$$

2. TAGGARD.—Find the cost of painting a dog kennel 5 feet long, 2 feet wide, each side being 2 feet high, and the perpendicular height of the ridge of roof from the ground being $3\frac{1}{3}$ feet, at 3d. per square foot. *(Scholarship*, 1882.*)*

$$\text{Height of ridge from sides} = (3\tfrac{1}{3} - 2) \text{ ft.}$$

$$= 1\tfrac{1}{3} \text{ ft.};$$

$$\text{Breadth of side of roof} = \sqrt{(1\tfrac{1}{3})^2 + 1^2} \text{ ft.}$$

$$= \sqrt{\tfrac{16}{9} + 1} \text{ ft.}$$

$$= \sqrt{\tfrac{25}{9}} \text{ ft.}$$

$$= \tfrac{5}{3} \text{ ft.};$$

$$\text{Area of sides} = \{(5 \times 2) \times 2\} \text{ sq. ft.}$$

$$= 20 \text{ sq. ft.};$$

$$\text{,, roof} = \{(5 \times \tfrac{5}{3}) \times 2\} \text{ sq. ft.}$$

$$= (1\tfrac{2}{3} \times 10) \text{ sq. ft.}$$

$$= 16\tfrac{2}{3} \text{ sq. ft.};$$

$$\text{,, ends} = [\{(2 \times 2) + (1 \times 1\tfrac{1}{3})\} \times 2 \text{ sq. ft}]$$

$$= (5\tfrac{1}{3} \times 2) \text{ sq. ft.}$$

$$= 10\tfrac{2}{3} \text{ sq. ft.};$$

$$\therefore \text{Total area to be painted} = (20 + 16\tfrac{2}{3} + 10\tfrac{2}{3}) \text{ sq. ft.}$$

$$= 47\tfrac{1}{3} \text{ sq. ft.};$$

$$\therefore \text{Cost of painting} = (47\tfrac{1}{3} \times 3)\text{d.}$$

$$= 142\text{d.}$$

$$= \underline{11\text{s. } 10\text{d.}} \text{ Ans.}$$

3. CYCLOPS.—Find how many shillings can be placed on a table round another shilling in contact with it and each other. What would be the value of a silver coin three times as thick as a shilling which would just cover them all?

(Harrow School Entrance Examination, 1886.*)*

Number of circles that can be placed round another circle, all of the same size, is six, for distance of points of contact of two adjacent circles with central circle is equal to radius of circle, and circumference is equal to six times the radius.

∴ Number of shillings = 6. Ans.

Diameter of coin that would cover them all = 3 times diameter of shilling;

Now circles are to one another as the square of their radii or diameters;

$$\therefore \text{Value of silver coin} = 1\text{s.} \times 3^2 \times 3$$

$$= 27\text{s.}$$

$$= \underline{£1\ 7\text{s.}} \text{ Ans.}$$

Trigonometry.

1. TRURO.—Investigate an expression for the radius of a circle, which touches one side of a triangle and the other two sides produced.

If R_1 is the radius of the circle touching side a and the other two produced, and R_2 that of the circle touching b and the other two produced, show that

$$R_1 R_2 = ab(\cos \tfrac{1}{2} C)^2.$$

(Science and Art, 1879.*)*

N.B.—The latter part of the question only is required.

$$R_1 = \frac{a \cos \frac{B}{2} \cos \frac{C}{2}}{\cos \frac{A}{2}}$$ *(Todhunter's* 'Plane Trigonometry,' page 185),

$$R_2 = \frac{b \cos \frac{A}{2} \cos \frac{C}{2}}{\cos \frac{B}{2}}$$

$$\therefore R_1 R_2 = ab \times \frac{\cos \frac{B}{2} \cos \frac{C}{2}}{\cos \frac{A}{2}} \times \frac{\cos \frac{A}{2} \cos \frac{C}{2}}{\cos \frac{B}{2}}$$

$$= ab \times \cos \frac{C}{2} \times \cos \frac{C}{2}$$

$$= ab(\cos \tfrac{1}{2} C)^2.$$

2. MOSS.—Calculate the ratio of the parts into which a regular pentagon is divided by a line joining an angular point to either end of the opposite side. *(Science and Art*, 1881.*)*

If a represent side of regular polygon and n number of sides,

$$\text{Area of polygon} = \frac{na^2}{4} \cot \frac{\pi}{n};$$

$$\text{Angle of polygon} = \frac{(n-2)\pi}{n}.$$

$$\therefore \text{Area of regular pentagon} = \frac{5a^2}{4} \cot \frac{180^\circ}{5}$$

$$= \frac{5a^2}{4} \cot 36^\circ.$$

One of the parts into which the pentagon is divided is an isosceles triangle of side a and included angle

$$\frac{(5-2)\pi}{5} = \frac{3 \times 180^\circ}{5} = 108^\circ.$$

$$\therefore \text{Area of triangle} = \tfrac{1}{2}a^2 \sin 108^\circ$$

$$= \frac{a^2}{2} \sin 72^\circ.$$

∴ One part : Other part

$$:: \frac{a^2}{2} \sin 72^\circ : \frac{5a^2}{4} \cot 36^\circ - \frac{a^2}{2} \sin 72^\circ,$$

$$:: \tfrac{1}{2} \sin 72^\circ : \tfrac{5}{4} \cot 36^\circ - \tfrac{1}{2} \sin 72^\circ,$$

$$:: 2 \sin 72^\circ : 5 \cot 36^\circ - 2 \sin 72^\circ,$$

$$:: 2 \times 2 \sin 36^\circ \cos 36^\circ : 5 \frac{\cos 36^\circ}{\sin 36^\circ} - 2 \times 2 \sin 36^\circ \cos 36^\circ,$$

$$:: 4 \sin^2 36^\circ : 5 - 4 \sin^2 36^\circ,$$

$$:: 4\left(\frac{\sqrt{10 - 2\sqrt{5}}}{4}\right) : 5 - 4\left(\frac{\sqrt{10 - 2\sqrt{5}}}{4}\right)^2,$$

$$:: \frac{\sqrt{100 - 40\sqrt{5} + 20}}{4} : 5 - \frac{\sqrt{100 - 40\sqrt{5} + 20}}{4},$$

$$:: \frac{\sqrt{120 - 40\sqrt{5}}}{4} : 5 - \frac{\sqrt{120 - 40\sqrt{5}}}{4},$$

$$:: \sqrt{\tfrac{15}{2} - \tfrac{5}{2}\sqrt{5}} : 5 - \sqrt{\tfrac{15}{2} - \tfrac{5}{2}\sqrt{5}}.$$

3. B'HAM.—If x satisfy the two equations

$$x^2 + a^2 - 2ax\cos\theta = b^2$$
$$x^2 + a^2 - 2ax\cos(60^\circ - \theta) = c^2,$$

show that $2x^2 = a^2 + b^2 + c^2 \pm 4\,\mathrm{S}\sqrt{3}$,
where S denotes area of triangle whose side are a, b, and c. (*Science Subject V.*, 1884.)

$$(1)\quad x^2 + a^2 - 2ax\cos\theta = b^2$$
$$x^2 + a^2 - b^2 = 2ax\cos\theta$$
$$\therefore \cos\theta = \frac{x^2 + a^2 - b^2}{2ax}$$
$$\cos^2\theta = \left(\frac{x^2 + a^2 - b^2}{2ax}\right)^2$$
$$= \frac{x^4 + a^4 + b^4 + 2a^2x^2 - 2b^2x^2 - 2a^2b^2}{4a^2x^2}.$$

$$(2)\quad x^2 + a^2 - 2ax\cos(60^\circ - \theta) = c^2$$
$$x^2 + a^2 - c^2 = 2ax\cos(60^\circ - \theta)$$
$$= 2ax(\cos 60^\circ\cos\theta + \sin 60^\circ\sin\theta)$$
$$= 2ax\left(\tfrac{1}{2}\cos\theta + \frac{\sqrt{3}}{2}\sin\theta\right)$$
$$= \frac{x^2 + a^2 - b^2}{2} + ax\sqrt{3}\sin\theta$$
$$ax\sqrt{3}\sin\theta = x^2 + a^2 - c^2 - \frac{x^2 + a^2 - b^2}{2}$$
$$= \frac{2x^2 + 2a^2 - 2c^2 - x^2 - a^2 + b^2}{2}$$
$$\therefore \sin\theta = \frac{x^2 + a^2 + b^2 - 2c^2}{2ax\sqrt{3}}$$
$$\sin^2\theta = \left(\frac{x^2 + a^2 + b^2 - 2c^2}{2ax\sqrt{3}}\right)^2$$
$$= \frac{x^4 + a^4 + b^4 + 4c^4 + 2a^2x^2 + 2b^2x^2 - 4c^2x^2 + 2a^2b^2 - 4a^2c^2 - 4b^2c^2}{12a^2x^2}.$$

$$\operatorname{Sin}^2\theta + \cos^2\theta = \frac{x^4 + a^4 + b^4 + 4c^4 + 2a^2x^2 + 2b^2x^2 - 4c^2x^2 + 2a^2b^2 - 4a^2c^2 - 4b^2c^2}{12a^2x^2}$$
$$+ \frac{3x^4 + 3a^4 + 3b^4 + 6a^2x^2 - 6b^2x^2 - 6a^2b^2}{12a^2x^2}$$
$$1 = \frac{4x^4 + 4a^4 + 4b^4 + 4c^4 + 8a^2x^2 - 4b^2x^2 - 4c^2x^2 - 4a^2b^2 - 4a^2c^2 - 4b^2c^2}{12a^2x^2}$$
$$3a^2x^2 = x^4 + a^4 + b^4 + c^4 + 2a^2x^2 - b^2x^2 - c^2x^2 - a^2b^2 - a^2c^2 - b^2c^2$$
$$x^4 - a^2x^2 - b^2x^2 - c^2x^2 = -a^4 - b^4 - c^4 + a^2b^2 + a^2c^2 + b^2c^2$$
$$x^4 - (a^2 + b^2 + c^2)x^2 + \left(\frac{a^2 + b^2 + c^2}{2}\right)^2 = \frac{a^4 + b^4 + c^4 + 2a^2b^2 + 2a^2c^2 + 2b^2c^2}{4}$$
$$- a^4 - b^4 - c^4 + a^2b^2 + a^2c^2 + b^2c^2$$
$$= \frac{-3a^4 - 3b^4 - 3c^4 + 6a^2b^2 + 6a^2c^2 + 6b^2c^2}{4}$$
$$= \frac{3(-a^4 - b^4 - c^4 + 2a^2b^2 + 2a^2c^2 + 2b^2c^2)}{4}$$
$$= \frac{3(a + b + c)(a + b - c)(a + c - b)(b + c - a)}{4}$$
$$= \frac{3 \times 16\,\mathrm{S}}{4} \text{ (where S = area of triangle whose sides are } a, b, \text{ and } c)$$
$$x^2 - \frac{a^2 + b^2 + c^2}{2} = \pm 2\mathrm{S}\sqrt{3}$$
$$x^2 = \frac{a^2 + b^2 + c^2}{2} \pm 2\mathrm{S}\sqrt{3}$$
$$\therefore 2x^2 = a^2 + b^2 + c^2 \pm 4\mathrm{S}\sqrt{3}.$$

Publications Received.

Bell, G., and Sons—
Syllabic Spelling. Parts 1 and 2. By C. Barton.

Blackie and Son—
Commercial Education. An Address by Dr. W. G. Blackie.

Chambers, W. and R.—
Test Exercises in Algebra. Stages 1, 2 and 3.

Chapman and Hall—
An Elementary Text-Book of Practical Metallurgy. By A. Roland Gower.

Curwen, J., and Son—
School Cantatas:
  The Fairy Grotto. By G. W. Stratton.
  Prairie Life. By A. T. Foxwell.
The Training College Music Course. By E. Mills, Mus.Bac.

Heywood, John—
Manchester Tracts on Education. By J. H. Newbold, B.A.
  Tract 2, Overstrain in Primary Schools.
  Tract 3, Technical Education.

Hodgson, F.—

The Elements of Logarithms. By W. Gallatly, M.A.

Johnston, W. and A. K.—

Movable Alphabets and Numerals for Elementary Schools and Home Teaching.

Longmans and Co.—

Longmans' Junior School Geography. By G. G. Chisholm' M.A., B.Sc.
The 'Practical' Mental Arithmetic for Schools.
Dress Cutting Out. By Mrs. Greenfell and Miss Baker.

Macmillan and Co.—

Geography of the British Isles. By Archibald Geikie, LL.D., F.R.S.
Arithmetic for Beginners. By the Rev. J. B. Lock, M.A.

Miscellaneous—

Little Favourites: Juvenile Poems. Arranged by Bella Gall.

Moffatt and Paige—

Macaulay's Essay on Addison (with Notes).

Murray, John—

The Eton Latin Grammar. By Francis Hay Rawlins, M.A., and William Ralph Inge, M.A.
The Eton Horace, Part I., Text, Odes, Epodes, &c.
" " Notes.

National Society's Depository—

Scholarship Questions. 1887.
Sight-Singing and the Theory of Music.

Nelson, T., and Sons—

Young Folks' Natural History. Standard IV.
The Rocket. Standard V.

Philip, G., and Son—

Practical and Conversational Lessons in Spanish. By J. W. Ralfs.

Pitman and Sons—

A Manual of the Type-Writer. By J. Harrison.
A Manual of Phonography.

Skerry, G. E.—

The Practical Guide to the Civil Service and Professions. By G. E. Skerry.

Smith, Elder and Co.—

The Cornhill Magazine. May.

Swan Sonnenschein and Co.—

The Cyclopædia of Education. Part 4.
British Birds. By W. Harcourt Bath.
The Beginners' Book in French. By Sophie Doriot.
A First History of the English People. Parts 3 and 4. By Amy Baker.
Silkworms. By E. A. Butler, B.A., B.Sc.

Tildesley and Co.—

The London Matriculation Guide.
The Student Interpreter's Guide.
Lower Division Men Clerks' Guide.
The Higher 'Exam.' Coach.
Complete Guide to the London Matriculation.

Ward, Lock, and Co—

Sound, Light, and Heat. By T. Dunman and Chapman Jones.
Electricity and Magnetism. By T. Dunman and Chapman Jones.

The 'Practical Teacher' Sale and Exchange Column.

For Sale.—Prince's 'School Management,' 2s.; Park's 'Manual of Method,' 1s.; Major's 'How to Earn Merit Grant,' 3s.; Saunder's 'Class Management,' 1s.; 'Notes of Lessons,' by W. Taylor, 1s.; Moffatt's 'How to teach Grammar,' 9d.; Moffatt's 'How to teach Arithmetic,' 1s.; Todhunter's Euclid, 1s. 10d.; Collier's 'Advanced History,' 1s. 4d.; Hughes' 'Modern Geography' (Revised), 1s. 10d.; Heywood's 'Complete Guide to Scholarship and Certificate,' 1s.; including half postage.—Teacher, 18, Rishton-lane, Bolton.

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BY DR. GEORGE BEACH.

Head Master of Christ Church School, Macclesfield.

READING.

A candidate whose reading requires much attention to be passable is generally 'a bad all round man' with very little chance of success. Yet easy as it is to read tolerably and fluently, and thus score a moderate number of marks, it is astonishing how few really good readers—good elocutionists—there are who show that proficiency '*in the higher qualities of Reading (such as expression, modulation of the voice, and correct delivery of long and involved sentences)*' which is necessary to secure a high position. Mere mechanical accuracy may easily be obtained by constant recourse to a dictionary and by conversation with educated persons. Fluency, too, may be acquired with equal facility by constant practice; but these two qualities alone are far from constituting elocution. For this accomplishment are required many and varied endowments, some mental, others bodily—a quick intelligence, a vivid imagination, a lively sympathy, a sound judgment, a flexible voice, and a good ear.

To read all passages well, the whole of these qualifications sedulously cultivated are necessary, and as they are somewhat conflicting very few persons possess them in such symmetry as to be good 'renderers' of every style of composition—to be able to range 'from grave to gay, from lively to severe.'

How is our Student to correct his defects and acquire the various styles?

We cannot pretend to wade through, and bid him beware of, all the various provincial defects or vulgarisms, and to suggest remedies for them, but the student will be credited with an ordinary amount of culture and discernment.

First, let him study the passage before reading it (even at the Examination it should hurriedly be looked over); second, let him read to good readers, to any public audience, to his class, to his companions; third, let him declaim to himself—thrusting aside the fear of being too theatrical (everybody will here quote to him the example of Demosthenes); fourth, he should listen to good preachers, to attain a grave style—to good comedians, tragedians, and orators to secure a playful, a solemn and mournful, and a generally impressive style.

Read ALOUD, therefore, humorous, ironical, pathetic, tragic, theological, and political writings (devoting particular attention to the books selected by the Department for your English), having previously studied them, and entered within the author's meaning, and particularly endeavouring to overcome any physical defects or impediments.

Speeches, plays, and sermons composed especially for actual delivery or performance, obviously afford greater facilities for improvement in reading, than books intended for silent perusal and the quietude of the study.

By attention to the foregoing hints, not only good reading may be secured, but one's style of literary composition will be most materially improved.

'Acting Teachers must read to the Inspector at his annual visit to their schools. They are not required to recite.'

ROUTINE FOR JUNE. (MALES.)

DAY	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
MONDAY	Draw up a weekly Routine for a School of 200 Scholars and 7 Standards, staff consisting of Head, Assistant, and 2 P. T.'s.	Revise Euclid, Book III.	Paraphrase Lines 116—135, of Cæsar, Act III. Scene 2 √	First 100 Deductions of Egan, Part II.	Paraphrase Comus, Lines 555—574 √	Commerce of England	Persons or deities, &c., mentioned in Comus	Map of British South Africa	History — Thirteenth and Fourteenth chapters of McCarthy	School Management — Rewards and Punishments	Deductions. — 131—145 of Egan, Part II.	Revise Syntax of Nouns, Pronouns, and Verbs
TUESDAY	Political Geography of British South Africa	Arithmetic — Race and Train Questions involving different rates of speed	Outlines of English History, to end of Richard II.	Arithmetic. — More difficult problems involving the L.C.M.	History — Twelfth and Thirteenth chapters of McCarthy	Notes of Lessons on 'Colonization'	Study the Syntax of Verbs	Algebra — Arithmetical and Geometrical Progression	Statutes of 'Mortmain,' 'De Tallagio non Concedendo,' 'Provisors,' 'Treasons'	Revise Third Book of Euclid	Notes and Text of Comus to line 813	Management of the Voice, Windows, Gas-lights, and Wall-colouring of Schoolroom
WEDNESDAY	Problems involving simultaneous Quadratics	Revise first 37 pages of Jevon's Logic Primer	First 85 Deductions of Egan, Part II.	Algebra — Arithmetical Progression	Euclid, Book IV.	Write out the character of Brutus	Deductions — 116—130 of Egan, Part II.	Paraphrase (About p. 11 of Essay on Milton) 'The fascination of sea and loveliness. . . . . . . they can excite a strong public feeling'	How climate affects 'National Character'	Map of Hindostan	Mensuration of the Sphere or Arithmetic	History — Revise McCarthy
THURSDAY	Write 30 lines of Composition upon 'When love begins to sicken and decay it useth an enforced ceremony'	Write a Large-Hand Copy of the words 'Baron von Hardenberg,' and 30 Small-Hand lines of 'The castled crags of Drachenfels'	First IX. Propositions of Euclid, Book IV.	Political Geography of British South Africa	Compound Interest with its Algebraic Formulæ	Lives of Wallace, The Black Prince, John of Gaunt, and Wyclif	Revise Miscellaneous Arithmetical Problems (Capel's Catch Questions)	History — Fifteenth chapter of McCarthy	Algebra — Harmonical Progression	Notes and Text of Cæsar to end of Act IV. Scene 2	Algebra — The Three Progressions	Notes of Lesson on 'The Cabinet System'
FRIDAY	Notes of Cæsar to end of Act IV. Scene 2	Formation of Dew, Hoar Frost, Hail, Snow, Rain, and Fog	Mensuration of Cylinders or Arithmetic	Algebra — Geometrical Progression	Canon Warburton's Article in our May issue on Pestalozzi	Deductions — 101—115 of Egan, Part II.	Flora and fauna of Arctic and Antarctic Zones	Revise Second Book of Euclid	Write out Macaulay's observations upon Comus (Essay on Milton)	Revise Deductions	Read carefully through the last half of the Essay on Addison	All Geography of Ireland

DAY	FIRST WEEK				SECOND WEEK				THIRD WEEK				FOURTH WEEK			
SATURDAY	Important Dates to end of Edward II.	Notes of Cæsar to end of Act IV. Scene 2	Revise Algebra	Water Supply for Schools. Construction of Buildings (To end of p. 67 of Carpenter's Hygiene)	Notes of Comus to line 658	The Summary Register	Revise First Book of Euclid	Mensuration of the Sphere or Arithmetic	All Geography of Scotland	Miscellaneous Arithmetical Problems (Capel's Catch Questions)	Outlines of English History to end of Henry V.	Revise Algebra	Sums involving areas of sides of solids, etc.	Important Dates to end of Richard II.	Revise Algebra	Write, *for future use*, a Summary of Canon Warburton's Article on Pestalozzi

ROUTINE FOR JUNE. (FEMALES.)

<table>
<tr><th>DAY</th><th colspan="12">FIRST WEEK</th><th colspan="12">SECOND WEEK</th><th colspan="12">THIRD WEEK</th><th colspan="12">FOURTH WEEK</th></tr>
<tr><td>MONDAY</td><td colspan="4">Draw up a Weekly Routine for a School of 200 Scholars; staff consisting of Head, Assistant, and 2 P. Teachers</td><td colspan="4">Analyse, and Parse difficult words of Cæsar, Lines 208—221, Act III. Scene 2.</td><td colspan="4">All Geography of England</td><td colspan="4">American War of Independence</td><td colspan="4">Explain with examples, 'Factor,' 'G.C.M.,' 'Power,' 'Prime Number,' 'Composite,' 'Ratio'</td><td colspan="4">Political Geography of Victoria and New South Wales</td><td colspan="4">State fully how you would diet a person recovering from a chest disease</td><td colspan="4">Revise first 37 pages of Jevon's Logic Primer</td><td colspan="4">Map of Canada</td><td colspan="4">Arithmetic — Averages</td><td colspan="4">Revise the Geography of Australia</td><td colspan="4">Composition upon 'The influence of Printing upon civilization'</td></tr>
<tr><td>TUESDAY</td><td colspan="4">Fox's Libel Bill. Trials of Wilkes and Horne Tooke. Letters of *Junius*</td><td colspan="4">Exercises in Mental Arithmetic</td><td colspan="4">Paraphrase Lines 29 to 47 of Act IV. Scene 2 (Cæsar)</td><td colspan="4">Physical Map of Scotland</td><td colspan="4">What would be a fair annual charge per child for clothing 30 girls aged from 10 to 13? Give particulars of cost& materials</td><td colspan="4">Describe the different methods of patching; which do you prefer and why?</td><td colspan="4">Water supply for Schools. Construction of Buildings. (To end of p. 67 of Carpenter's Hygiene)</td><td colspan="4">What days of the week were (or will be) March 15th, 1867 May 10th, 1800 Dec. 31st, 1762 Jan. 2nd, 1899? Work other examples</td><td colspan="4">Political Geography of remainder of Australia</td><td colspan="4">Describe a good filter. How would you extemporise one with a tree-pot and sponge? Natural filtration</td><td colspan="4">Distinguish between the duties of a child's maid, a kitchen maid, and an under house maid</td><td colspan="4">Practise any 'Cutting-out' wherein you are most deficient.</td></tr>
<tr><td>WEDNESDAY</td><td colspan="4">Describe six inexpensive and nutritious dinners for children, stating cost and amount of materials required</td><td colspan="4">Notes of a Lesson on 'Colonization'</td><td colspan="4">Procure a 'Scale Drawing Book' and draw therein the required sewing diagrams</td><td colspan="4">Gordon Riots (1780) Birmingham Riot (1791)</td><td colspan="4">Give and explain the rule for reducing Vulgar Fractions to Decimals</td><td colspan="4">Syntax of Nouns, Pronouns, and Verbs</td><td colspan="4">Revise Geography of Scotland</td><td colspan="4">What properties are contained in the fibrin, albumen, and gelatine of flesh? Why is fresh meat more nutritious than salt?</td><td colspan="4">Canon Warburton's Article on Pestalozzi in our May issue</td><td colspan="4">Study the text of the Essay upon Addison</td><td colspan="4">Describe the various methods of repairing stockings; and when should each be employed?</td><td colspan="4">The Summary Register.</td></tr>
<tr><td>THURSDAY</td><td colspan="4">Map of Australia</td><td colspan="4">Practise 'grafting, Swiss darning, running darn as for heel'</td><td colspan="4">Arithmetic — Prices of 'Mixtures' various quantities at different prices</td><td colspan="4">Management of the voice. Windows, Gas Lights, and Wall Colouring of the Schoolroom</td><td colspan="4">How would you cook a mutton chop, a small sole, and a mackerel? How would you make a rice, a bread, and a batter pudding?</td><td colspan="4">Lives and works of Pope, Thompson, Collins, Evelyn, Pepys, Hume</td><td colspan="4">Analyse, and Parse difficult words of Cæsar, lines 18—26, Act IV. Scene 1.</td><td colspan="4">American War of Independence</td><td colspan="4">Arithmetic — Partnership</td><td colspan="4">Revise Geography of Ireland</td><td colspan="4">What are the duties of a nurse? Write out a few plain rules for her guidance</td><td colspan="4">Prove that if the denomination of a Vulgar Fraction is x, there cannot be more than $(x-1)$ places in its equivalent decimal</td></tr>
<tr><td>FRIDAY</td><td colspan="4">Vaccination: its History, Theory, Advantages, Disadvantages</td><td colspan="4">Questions on Comp. Int. due at other than annual periods</td><td colspan="4">History of South African Colonisation.</td><td colspan="4">Paraphrase Lines 116—135 of Cæsar Act III. Scene 2.</td><td colspan="4">Learn to cut out imitation lace, &c., in paper, suitable for trimming the various garments</td><td colspan="4">Notes of a Lesson on 'the Cabinet System'</td><td colspan="4">State what you know (mentioning advantages and disadvantages) of Sick, Death, and Benefit Clubs</td><td colspan="4">Write 30 lines of Composition upon 'When love begins to sicken and decay it useth an enforced ceremony'</td><td colspan="4">Practise 'Stocking Web and a 'Print Patch'</td><td colspan="4">School-Management — Rewards and Punishments</td><td colspan="4">Study the text of the Essay upon Addison</td><td colspan="4">Outlines of History from 1748 to 1760</td></tr>
<tr><td>SATURDAY</td><td colspan="3">What do you consider the finest passages in Cæsar, and how do they illustrate Shakespere's genius?</td><td colspan="3">Stamp Act (1765). American Import Duties' Act (1767). Battles of Lexington and Bunker's Hill</td><td colspan="3">Physical Features of Australia</td><td colspan="3">Write a Large hand copy of the words 'Baron Von Hardenberg' and 30 Small hand lines of 'The castled crags of Drachenfels'</td><td colspan="3">What are 'Consols,' 'Stock,' 'Brokerage,' 'Preference Stock'</td><td colspan="3">Notes of Cæsar to end of Act IV. Scene 2</td><td colspan="3">What puddings are suitable for sick people? Describe the making of three kinds</td><td colspan="3">Practise the different 'darns' as before, and darning 'edge tear'</td><td colspan="3">Arithmetic — Equation of Payments</td><td colspan="3">Notes of Cæsar to end of Act IV. Scene 2</td><td colspan="3">Procure a 'Scale Drawing Book' and draw therein the required sewing diagrams</td><td colspan="3">Mutinies at the Nore, Spithead, and Plymouth — West Indian affairs</td><td colspan="3">Revise the Syntax of Nouns, Pronouns, and Verbs</td><td colspan="3">Geography of New Zealand</td><td colspan="3">Revise any Arithmetic</td><td colspan="3">Draw up for future use a Summary of the article on Pestalozzi</td></tr>
</table>

COMPOSITION

Is a most important part of the English required, and also intrudes into every subject of the curriculum, excepting perhaps Mathematics. However 'unadorned and plain' School Management, Geography, History, Domestic Economy, &c., may be by themselves, they can be rendered attractive by the graces of Literary Composition.

Without doubt, facts pleasingly set forth and orderly arranged will impress the examiner far more favourably than an equal amount of 'dry-as-dust' information. Notwithstanding, Composition is only 'the dress not the corpus' of the above-mentioned subjects; and when space is limited (as it generally is) it is well to remember that 'the body is more than the raiment.'

Throughout the generality of the subjects conciseness and incisiveness are therefore demanded, leaving to the Composition Exercise proper its more flowing and amplified style.

Thus, there are for the student two species of Composition to study and practice. First (and this involves skill in summarising and epitomising) the art of succinctly answering questions. Second, the general art of expressing ideas lucidly, powerfully and attractively.

Of the first kind we need say little, since our pupils may imitate with much advantage the 'Model Certificate Answers,' now appearing in THE PRACTICAL TEACHER. Yet we would recommend that they take, in addition, any tabulated information such as a list of battles or a catalogue of mountains, and endeavour to describe from them the given campaign or the physical features of the particular country. This is a very severe though very profitable test. Of the second kind we must discourse more fully yet still briefly.

The Exercise demanded by the Department must not be omitted under the penalty of total failure. It is essential to a pass. By the authorities it is recommended that only thirty minutes be devoted to this Exercise.

Generally the candidate has a choice of four subjects, upon any one of which he may write his essay. These subjects are picked from the wide universe, comprise both the abstract and the concrete—yet are nevertheless so selected that 'every schoolboy knows' something of one of them.

Were every paper set as fairly as the Composition Exercise no possible fault could be found. Excluding last year's themes (which are dealt with elsewhere in our columns), the following are the most recent:—

Males.—For 1886.—I. The Colonial and Indian Exhibition; II. The Queen's Jubilee; III. 'He that hath wife and children, hath given hostages to fortune;' IV. 'The gods are just, and of our pleasant vices make instruments to plague us.'—For 1885.—I. The discovery of the Bermudas;' II. The belief in witchcraft in the days of Elizabeth; III. 'Some kinds of baseness are nobly undergone;' IV. 'We are such stuff as dreams are made of.'—For 1884.—I. The arbitrary government of Richard II.; II. Trial by ordeal; III. 'Within the hollow crown that rounds the mortal temples of a king, keeps Death his Court.'

Females.—For 1886.—I. Any factory, building, or memorable spot; II. The distinction between Art and Science; III. The conditions to be fulfilled in a perfect drama; IV. 'For a crowd is not company, and faces are but a gallery of pictures.'—For 1885.—I. Recreation; II. Self Respect; III. The Post Office; IV. 'Sermons in stones—books in the running brooks.'—For 1884.—I. Early Friendship; II. Advantages and possible Abuses of Liberty of the Press; III. Art and Science for the people; IV. Write a story illustrating some popular proverb.

We have reason to judge that subjects like 'III. '86' and 'IV. '85' (Males) and 'IV. '86' and 'IV. '85' (Females) are favourite ones with the Department, and that their selection by the Examinee favourably impresses the average Examiner. Moreover, as they are chosen from the play or essay which has been studied, the answerer can by them show his appreciation of the spirit of the author, and has more scope for originality than in such as 'I. '86.'

In our Routine suitable themes will be found.

Before commencing to write, *the skeleton of the essay should be drawn up.* It is most important that the logical sequence should be carefully preserved, as it materially assists the articulation of the various sentences and paragraphs, and prevents that painful disjointedness which is often so apparent in the efforts of amateurs.

Next, *the style adopted should be carefully selected. Where possible 'make your theme your example.'* Just as there are onomatopoetic words, so there are onomatopoetic styles. How splendidly Denham observes this (his own) rule in apostrophising the Thames!

'O could I flow like thee, and make thy stream
My great example, as it is my theme,
Though deep yet clear, though gentle yet not dull,
Strong without rage, without o'erflowing, full.'

Southey's 'Cataract of Lodore' furnishes an excellent example of an opposite style, yet suited to its subject. Study likewise Dryden's 'Alexander's Feast' and his 'Ode on St. Cecilia's Day,' Pope's 'Ode on St. Cecilia's Day,' and Collins' 'Passions'—all of which were composed purposely to illustrate this principle.

For Prose, note Shakespere's ever-varying style (when he nods it is not purposeless), and carefully discriminate the difference between Macaulay describing a battle, and discussing a philosophical theorem. Of course read Addison, but *avoid newspaper 'leaders.'*

See also our remarks on Reading (supra). A good reader cannot be a bad literary composer. His cultivated ear will not let him stray too far. He will mentally read-over his productions, and imagine their effect, detecting thereby a weakness here, a monotony there, or perhaps a rugged uncouthness, requiring the substitution of emphasis, variety, or a more refined flow of expression.

'Short sentences and simple Saxon words' are generally and wisely advised; but we venture to affirm that our rule 'adapt your style to your subject' is a better and more comprehensive one. Nobody advocates the use (or abuse) of Johnson's 'anfractuose' verbosity and Clarendonian sentences in order to inflate a simple story, but in subtle disquisitions and involved controversies the long-resounding word and the complex sentence are more than merely justifiable.

But beware of a mixed style. 'If thy heart fail thee do not climb at all.' Compare (1) '*He put out the fire.*' (2) '*He extinguished the conflagration.*' (3) '*He put out the conflagration.*'

No. (1) is the best in describing a simple incident, but bad as No. (2) is, it is better than No. (3) which is 'horribly mixed.'

Begin your sentences with different parts of speech, except where the emphasis of repetition dictates otherwise.

COMPARE.

Longer Sentences commencing in varied ways.	*Shorter Sentences beginning with Nouns or Pronouns.*
'Of all poets who have introduced into their works the agency of supernatural beings, Milton has succeeded best.	Poets have often introduced into their works the agency of supernatural beings. Milton has succeeded better than any of them.
Here Dante decidedly yields to him; and as this is a point on which many rash and ill-considered judgments have been pronounced, we feel inclined to dwell on it a little longer.'	Dante decidedly yields to him here. This is a point on which many rash judgments have been pronounced. We feel inclined therefore to dwell on it a little longer.

For 'the emphasis of similar construction,' see Macaulay's 'Relief of Londonderry.'

Lastly, *be exceedingly careful to punctuate correctly.*

As any respectable Grammar gives the commonplace rules for Composition, we shall not occupy our space therewith.

ANSWERS TO CORRESPONDENTS.

We shall be pleased to reply briefly, and through this column, to any seeking information or advice.

NORTHUMBRIA.—At any of the Departmental Examinations the highest class can be (but seldom is) secured by taking only the compulsory subjects. Your drawing will greatly help you.

S. W. L., BIRMINGHAM.—No apologies are needed for again addressing us. *Queries 1 and 3.*—Yes. *Query 2.*—Doubtful.

(To be continued.)

How to Teach School Children to Sing from Notes.

BY. W. G. McNAUGHT,

Associate of The Royal Academy of Music.

41. The tonic sol-fa notation of tune can be quickly understood by the most casual enquirer. The tonic sol-fa notation of time however requires closer examination, not merely because the signs employed are more arbitrary but because of the greater complexity of the facts to be shown. This circumstance sometimes leads teachers to neglect to study and teach time systematically and to put the blame upon the notation. But the educational advantage of the tonic sol-fa notation of time are great. The important facts of time are—

1st. The division of music into pulses.
2nd. The accent of pulses (forming measure).
3rd. The regular period of pulses.

In tonic sol-fa notation these facts are constantly shown by the signs for pulses, strong, weak and medium, and by placing these signs as far as practicable, equal in distance from one another; thus :--

| : | : | : |

shows strong and weak pulses in succession, and

| : : | : : | : : |

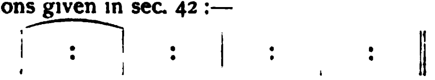
shows, strong, weak, weak, in succession.

The point in teaching is to exercise unusual care to make certain that the meaning of these arbitrary signs is familiarly known.

42. In teaching time-notation on the blackboard, much depends upon the ability of the teacher to write clearly. The strong pulse-signs should be thick and quite perpendicular, and the dots of the weak pulses should be large and close to each other, and pulse signs of all kinds should be equidistant. Much prejudice against the Tonic Sol-fa notation of time has been occasioned by the careless way in which it is too often written.

43. The first lessons in time notation to children should make the meaning of the signs abundantly clear. It is best to begin a lesson by drawing an exercise on the blackboard piecemeal in the presence of a class. A finished exercise, with notes in the pulses, presents at first too much at once for the eye to take in. Analysis of this sort can be better done after synthesis is well practised.

44. After clearly showing the strong and weak pulse signs, the idea of *measure* (the number of pulses from one strong pulse to the next) must be taught. It is best to get pupils to feel the grouping of pulses into sets of two's by ear exercises. For instance, the teacher sings three or four sets of strong weak, and asks the class to state how many *sets* they heard. Next, the class should sing from dictation two, three or more sets. The word measure should now be taught, and the class will then proceed to tell measures from the notation. Supposing the following to be written on the board in accordance with the directions given in sec. 42 :—



(The double line or bar shows the end of the exercise.) The teacher should draw a curve to show the first measure and get children to come out to draw similar curves.

45. Although the code requirements nowhere test time and tune in combination it is most desirable that they should be connected in at least a simple manner from almost the earliest stages. All the lessons suggested in sections 37 to 44 should be given to Div. II., while they are learning the Doh chord, and the time and tune so far explained should be combined, say as follows :—

|d :d |s :s |m :s |s :m |d :d ||

|d :d |m :m |d :m |s :s |d' :d ||

|d :m |s :m |d :s |m :d |s :d |

|d :s |m :s |d :d' |m :s |m :d |

The courses and educational charts published by Messrs. Curwen & Sons give many similar exercises.

46. The next step is to teach continuations. This may be done as follows: Teacher sings on a monotone to *laa* single tones sustained through two, three, four, &c. pulses, and elicits their value: the class sings in a similar manner at the dictation of the teacher: the continuation or 'keep on' mark is then taught and combined with easy tune. It is a good plan to get children to come out in turn and place 'keep on' marks where directed. Exercises such as the following are suggested.

|l :— |l :— |l :l |l :— |l :l |l :— ||

|d :— |m :— |s :m |d :— |m :s |d' :— |

|d :m ¦s :m |d :— ¦s :— ¦m :d |d' :— ||

|d :— ¦m :r |d :m |s :— ¦s :— |d' :t ¦d' :s |d' :— ||

Care must be taken that the continuations are sung as such. Children soon fall into the bad habit of breaking continuations from the note in the preceding pulse.

47. The medium pulse and four pulse measure must now be taught. The methods already described will suffice. The medium accent should be introduced in an ear exercise, imitated from pattern and prominently shown on the blackboard. Coloured chalk is useful at this stage. The eye gets accustomed to detach the short stroke of of the medium accent when it has seen it written in blue or yellow chalk. It is not necessary to spend much time to secure a refined distinction between two pulse and four pulse measure. The best performances of artistes often do not make perceptible distinctions between two and four pulse measure. Where the distinction is called for it is mostly made instinctively rather than in obedience to notation.

48. Pieces of music commence on weak or medium pulses quite as often as upon strong pulses. When the musical phrases of a piece commence upon strong pulses the measure is said to be *primary*, and when they commence on weak or medium pulses the measure is said to be *secondary*. Examples :—

Primary Measure.

| : ¦ : | : ||

Gen - tle spring is com - ing.

Secondary Measure.

: | : ¦ : | ||

The ec - ho of the horn.

49. Almost all the best tonic sol-fa teachers now employ a system of time names engrafted upon the method shortly before Mr. John Curwen's death. These time names are not a necessary feature of tonic sol-fa teaching: they are simply one method of cultivating the *sense* of rhythm, and they are found to be a most useful means of communication between teacher and pupil. They are mainly used in monotoning time exercises and in time ear exercises.

50. The time name for a whole pulse tone struck is TAA and for a whole pulse continuation -AA (*i.e.* TAA with the T omitted and a hyphen substituted).

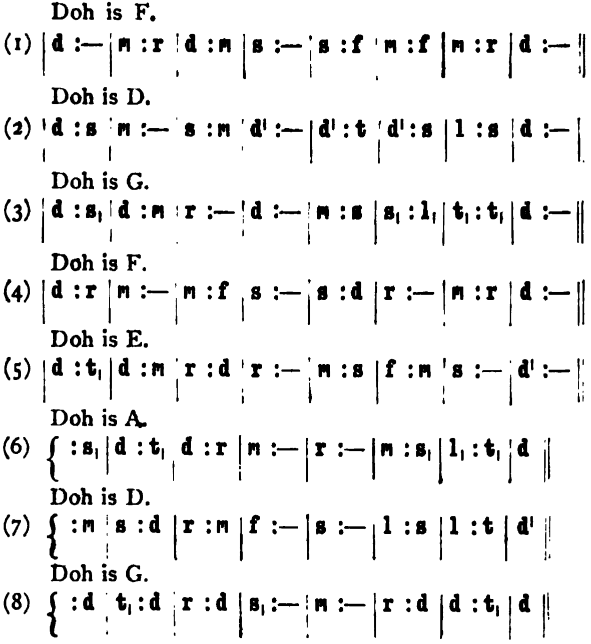
51. The code requirements make no mention of time names. Therefore they should be used only as preliminary practice and all exercises should in addition be sung on a monotone to *laa.*

DIVISION II.

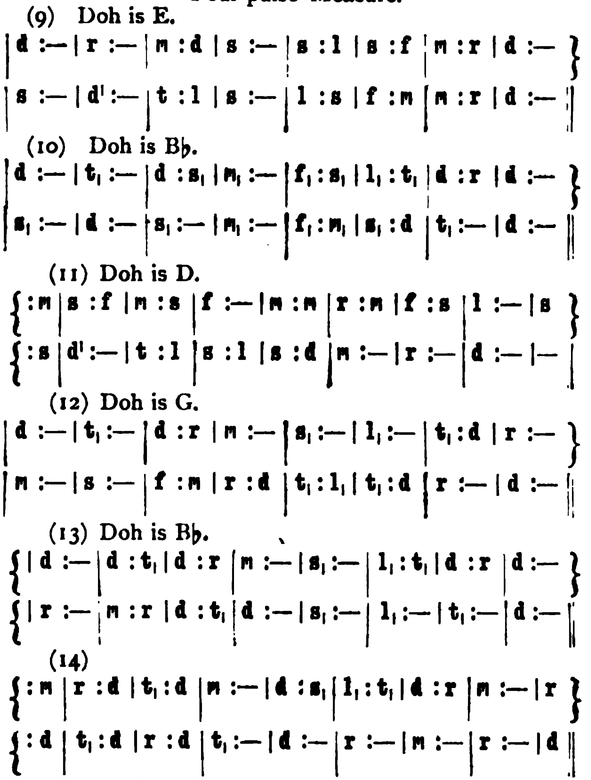
SPECIMEN CODE TESTS.

Time.

Two-pulse measure.



Four-pulse Measure.



The foregoing tests are written in tune as well as in time. They can be first written on the board with only 'laa' for the struck notes. But for the pleasure and profit of pupils they should be sung afterwards to some easy tune form. When sung in tune they should be sung in the Keys marked. It will be observed that some of the tests are in *secondary measure.*

(To be continued.)

Model Answers to Pupil Teacher Examination Papers.

21st April, 1888.

END OF FIRST YEAR.

Arithmetic.

(*Do three questions only, including question* 4, *if you can.*)

MALES ONLY.

1. Find the G.C.M. of 53261 and 52779. *Prove* that the number you have found is the G.C.M.

2. Reduce £5 6s. 9d. to the decimal of £100; and 3 tons 11 cwt. 55 lbs. to the decimal of 32 tons 3 cwt. 47 lbs.

3. Add together: ·175 of $2\frac{1}{2}$ acres, $17{\cdot}1\dot{9}$ of 3 roods, 3·125 of $1\frac{1}{4}$ acres.

4. How would you prove by division of a line that $\frac{3}{7}$ of $\frac{4}{9} = \frac{12}{63}$? Multiply $1\frac{2}{9}$ of $5\frac{1}{4}$ by $\frac{4}{17} \div 2\frac{1}{3}$.

(1)

```
52779)53261(1
      52779
      ─────
        482)52779(109
            482
            ───
             4579
             4338
             ────
              241)482(2
                  482
                  ═══
```

Proof.—241 measures 52779. It also measures 53261. ∴ it is a common measure.

It is also the G.C.M. For any number which measures these two numbers measures also their difference, *i.e.*, 482. For the same reason any number which measures 482 and 52779 measures the difference between 52779 and any multiple of 482, *i.e.*, 241.

But no number greater than 241 measures it. ∴ 241 is the G.C.M.

(2) £5 6s. 9d. to dec. of £100.

$$= \frac{£5\ 6s.\ 9d.}{£100}$$
$$= \frac{5\frac{27}{80}}{100}$$
$$= \frac{427}{8000}$$
$$= \frac{\cdot427}{8}$$
$$= \underline{\cdot053375}.\ \text{Ans.}$$

3 tons 11 cwt. 55 lbs. to the dec. of 32 tons 3 cwt. 47 lbs.

$$= \frac{3\text{ tons }11\text{ cwt. }55\text{lbs.}}{32\text{ tons }3\text{ cwt. }47\text{lbs.}}$$
$$= \frac{8007}{72063}$$
$$= \frac{1}{9}$$
$$= \underline{\cdot\dot{1}}.\ \text{Ans.}$$

(3) $\cdot175$ of $2\frac{1}{2}$ a. + $17{\cdot}1\dot{9}$ of 3 r. + $3{\cdot}125$ of $1\frac{1}{4}$ a.

$$= \frac{\cdot875}{2}\text{ a.} + 17\tfrac{18}{90} \times 3\text{ r.} + \tfrac{25}{8} \times \tfrac{5}{4}\text{ a.}$$
$$= \cdot4375\text{ a.} + 51\tfrac{3}{5}\text{ r.} + \tfrac{125}{32}\text{ a.}$$
$$= 1\text{ r. }30\text{ p.} + 12\text{ a. }3\text{ r. }24\text{ p.} + 3\text{ a. }3\text{ r. }25\text{ p.}$$
$$= \underline{17\text{ a. }0\text{ r. }39\text{ p.}}\ \text{Ans.}$$

(4) (*a*) I should divide the line into 9 parts, and then each of these divisions into 7 parts. Each of these subdivisions would be $\frac{1}{63}$ of the whole line. $\frac{4}{9}$ of the whole line would contain 28 of these subdivisions. $\frac{1}{7}$ of them would be four subs., and ∴ $\frac{3}{7}$ would be 12 of them or $\frac{12}{63}$.

(*b*) $1\frac{2}{9}$ of $5\frac{1}{4} \times \frac{4}{17} \div 2\frac{1}{3}$

$$= \tfrac{11}{9} \times \tfrac{21}{4} \times \tfrac{4}{17} \times \tfrac{3}{7}$$
$$= \underline{\tfrac{11}{17}}.\ \text{Ans.}$$

FEMALES ONLY.

1. Make out in proper form the following bill:

7 lbs of cheese, at $8\frac{3}{4}$d. per lb.;
19 lbs. of butter, at 1s. $1\frac{1}{2}$d. per lb.;
$7\frac{1}{2}$ lbs. of lard, at $10\frac{1}{2}$d. per lb.;
9 doz. boxes of matches, at 9 for 6d.

2. Find by Practice the value of 5 acres 3 roods 25 poles, at £35 10s. per acre.

3. $\frac{7}{9}$ of an iceberg is immersed in water; if $\frac{9}{10}$ had been immersed, 22,000 *additional* cubic feet would have been immersed; find the number of cubic yards in the iceberg.

4. How would you prove by division of a line that $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} = \frac{7}{8}$? Subtract $3\frac{1}{5} + 4\frac{3}{9}$ from $17\frac{7}{10}$.

(1) London,
April 21st, 1888.

Mrs. Jones,
Bought of Henry Brown.

	£	s.	d.
7 lbs. of cheese at $8\frac{3}{4}$d. per lb.		5	$1\frac{1}{4}$
19 lbs. of butter at 1s. $1\frac{1}{2}$d. per lb.	1	1	$4\frac{1}{2}$
$7\frac{1}{2}$ lbs. of lard at $10\frac{1}{2}$d. per lb.		6	$6\frac{3}{4}$
9 doz. boxes of matches at 9 for 6d.		6	0
	1	19	$0\frac{1}{2}$

(2)

	£	s.	d.		
	35	10	0	=	value of 1 acre
			5		
	177	10	0	=	,, 5 acres
2 roods = $\frac{1}{2}$ acre	17	15	0	=	,, 2 roods
1 rood = $\frac{1}{2}$ of 2 rds.	8	17	6	=	,, 1 rood
20 pls. = $\frac{1}{2}$ of 1 rd.	4	8	9	=	,, 20 pls.
5 pls. = $\frac{1}{4}$ of 20	1	2	$2\frac{1}{4}$	=	,, 5 ,,
	209	13	$5\frac{1}{4}$	=	value of 5 a. 3 r. 25 p.

(3) $\frac{9}{10} - \frac{7}{9} = \frac{81 - 70}{90} = \frac{11}{90}$ addl.

$\frac{11}{90}$ = 22,000 cubic feet.
$\frac{1}{90}$ = 2,000 ,,
$\frac{90}{90}$ = 180,000 ,,
= $6,666\frac{2}{3}$ cubic yards. Ans.

(4) I should divide the line into eighths. Then one half the line would represent four-eighths, one quarter would be two-eighths, and these added to one-eighth would make seven-eighths.

$$\begin{aligned} & 17\tfrac{7}{10} - (3\tfrac{1}{5} + 4\tfrac{3}{9}) \\ = {} & 10\tfrac{7}{10} - (\tfrac{1}{5} + \tfrac{3}{9}) \\ = {} & 10\frac{63 - (18 + 30)}{90} \\ = {} & 10\tfrac{15}{90} \\ = {} & 10\tfrac{1}{6}. \text{ Ans.} \end{aligned}$$

Composition.

[The passage should be read *once* distinctly, and then the substance of it is to be written down from memory.]

A famous naturalist was walking along the cliffs with his favourite dog Nero, and sat down to write some notes, while the dog scampered about. After a time Nero returned, but found only his master's hat and stick. He had gone down the face of a rock in order to get a rare flower he saw there, and now found that the tide had risen, and that it was impossible for him to return. Seeing the head of the dog peering over the cliff at him, he shouted 'Nero, good fellow, I am in danger; go for help.'

Nero seemed to understand his meaning perfectly, for he ran off to a village which was near, and, having attracted some men by his excitement, led them to the cliff. They fetched ropes and soon pulled up the gentleman. He had much reason to be proud of his dog, for the place was lonely, and no one else could have heard him shouting.

Grammar.

MALE AND FEMALE.

(*Answer questions 1 and 2 and one other question.*)

1. By torch and trumpet *fast arrayed*
Each horseman *drew his* battle blade,
And *furious* every charger *neighed*
To join the dreadful *revelry*.

Say how many sentences there are in these lines, and distinguish the subject, predicate, and other parts of each.

2. Parse the words printed in italic.

3. Show the meaning and use of the final syllable in each of the following words, and give other examples of words similarly formed:—

Bright*en*,	Heed*less*,	Harm*ful*,
Spin*ster*,	Read*er*,	Cold*ish*.

4. Make with each of the following words two sentences, so as to show that a word is not always the same part of speech:—

High	(*a*) as an adjective,	(*b*) as an adverb.
On	(*a*) as a preposition,	(*b*) as an adverb.
Light	(*a*) as an adjective,	(*b*) as a verb.
Step	(*a*) as a noun,	(*b*) as a verb.

(1) Two.
(*a*) *Subject*—Each horseman, fast arrayed by torch and trumpet,
Predicate—drew
Object—his battle blade.
(*b*) *Connective*—And
Subj.—Every charger
Pred.—neighed
Extension of Pred.—to join the dreadful revelry.

(2) *Fast*—adv. of time, mod. 'arrayed.'
arrayed—past part. of 'to array,' referring to 'horseman.'
each—distributive adj., qual. 'horseman.'
drew—verb, irreg., trans., act., ind., past, 3rd sing., agreeing with its nom. 'horseman.'
his—pers. pronoun, masc., sing., 3rd, poss. case, gov. by 'blade.'
furious—adv. of manner, modifying 'neighed.'
neighed—verb, reg., int., act., ind., past, 3rd sing., agreeing with its nom. 'charger.'
to join—verb, reg., trans., act., inf., pres., gov. by 'neighed.'
revelry—abstract noun, neut., sing., obj. case, gov. by 'to join.'

(3) *-en*—to make: forming verb from adj.; strengthen, weaken, widen.
-ster—agent: forming noun from verb; deemster, punster, trickster.
-less—without: forming adj. from noun; homeless, joyless, friendless.
-er—agent: forming noun from verb; player, binder, singer.
-ful—full of: forming adj. from noun; sorrowful, pitiful, wrongful.
-ish—having some of: adj. termination; reddish, brownish, whitish.

(4) *High*—as adj.: He climbed over a high wall.
as adv.: The water rose high above its usual limit.
On—as prep.: He walked on the wall.
as adv.: He read on till he was told to stop.
Light—as adj.: William carried a light stick.
as verb: I shall light the gas presently.
Step—as noun: She walks with a light step.
as verb: They step quickly on the street.

END OF SECOND YEAR.

Euclid.

MALES ONLY.

[All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operation*, such as −, +, ×.]

(*Answer two questions, including question 3, if you can do so.*)

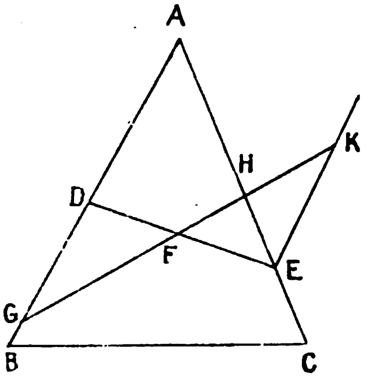
1. If two triangles have two sides of the one equal to two sides of the other, each to each, and have likewise their bases equal, the angle which is contained by the two sides of the one shall be equal to the angle contained by the two sides, equal to them, of the other.

Euclid, Book I., 8.

2. If from the ends of the sides of a triangle there be drawn two straight lines to a point within the triangle; these shall be less than the other two sides of the triangle, but shall contain a greater angle.

Euclid, Book I., 21.

3. If a straight line terminated by the sides of a triangle be bisected, no other straight line terminated by the same two sides can be bisected at the same point.



In the triangle ABC let the straight line terminated by the sides AB, AC be bisected at F. No other straight line terminated by AB, AC can be bisected at F.

If it be possible let any other line, as GFH, be bisected in F.

Then in triangle ADE the two ∠s ADE, AED are together < two right ∠s (I. 17).

From point E draw EK parallel to AD, and produce FH to meet EK in K.

Then in two △s FGD, FEK the ∠s FDG, GFD = ∠s KFE, FEK, each to each, and one side = one side, viz., DF = FE.

∴ (I. 26), △ FDG = △ FEK, and side FG = side FK.

But FH = FG (Hyp.)

∴ FH = FK, the less to the greater; which is impossible.

Wherefore if a straight line; &c.

Arithmetic.

(*Answer three questions only, including the last, if you can.*)

MALES ONLY.

1. Find the difference between the discount and the interest on a sum of £3,000, payable 5½ years hence at 4¼ per cent. per annum.

2. If 203 articles can be bought for £101 5s. 9¼d., how many may be bought for £104 5s. 7¾d.?

3. What saving to the country in annual interest would be effected by changing £7,105,100 Three per Cent. Stock at 102 to a 2¼ per cent. Stock at 85?

4. Explain the term average, and illustrate your definition by the average length of a calendar month in the year 1888; and find the average of 7·125 of 8 guineas, $8\cdot\dot{3}\dot{7}$ of 8s. 3d. and £36 13s. 11d.

1. Interest = 3000 × 5½ × 4¼ ÷ 100.
= 30 × £23 7s. 6d.
= 10 × £70 2s. 6d.
= £701 5s.

£ £ £ £
Discount = $100\frac{187}{8}$: 3000 : $\frac{187}{8}$: x

$$x = \frac{3000 \times 187 \times 8}{8 \times 987}$$

$x = \frac{187000}{329}$

x = £568 7s. $9\frac{123}{329}$d.

Diff. = £132 17s. $2\frac{206}{329}$d. Ans.

art. art.
2. £101 5s. 9¼d. : 104 5s. 7¾d. : 204 : 209. Ans.

3. £7,105,100 would produce—
7,105,100 × 3 × 100 = £213,153

It would sell out for—
7,105,100 ÷ 100 × 102

which being invested in 2¼ @ 85 would produce interest

$$\frac{7105100 \times 102 \times 2\frac{1}{4}}{85} = £191,837\ 14s.$$

The difference would therefore be £21,315 6s. Ans.

4. The term *Average* means the result obtained by dividing the sum of any number of terms by the number of terms. It is also called the *Mean.*

Thus, in 1888 there are twelve calendar months, the sum of whose days is 366. The average number of days ∴ = 366 ÷ 12 = 30½.

(7·125 of 8 guineas + $8\cdot\dot{3}\dot{7}$ of 8s. 3d. + £36 13s. 11d.) ÷ 3
= (7⅛ of 8 guineas + $8\frac{37}{99}$ of 99d. + £36 13s. 11d.) ÷ 3
= (£59 17s. + 829d. + £36 13s. 11d.) ÷ 3
= £100 ÷ 3.
= £33 6s. 8d. Ans.

FEMALES ONLY.

1. Define the terms multiple, common multiple, least common multiple, and find the least common multiple of 99821 and 66355.

2. Add together ⅗ of 11s. 3d.; $\frac{5}{9}$ of £4 10s. 4½d.; $1\frac{7}{11}$ of £2 7s. 8d.

3. What fraction is 3s. 3½d. of 11s. 1d.? 330 yds. of 1½ miles? 5¼ hours of 330 seconds?

4. Write out the rule for converting a vulgar fraction to its equivalent decimal. Express $\frac{3}{40}$, $\frac{9}{1600}$ as decimal fractions, and work the sums also in such a way as to show the reason for the rule.

1. A multiple of any number is that number taken two or more times.

A common multiple is a number which contains two or more numbers an exact number of times without a remainder.

The least common multiple is the least number which contains two or more numbers an exact number of times without a remainder.

66355)99821(1
66355
33466)66355(1
33466
32889)33466(1
32889
577)32889(57
2885
4039
4039

G.C.M. = 577.

577)66355 . 99821
115 . 173

L.C.M. = 577 × 115 × 173
= 11,479,415. Ans.

2. ⅗ of 11s. 3d. + $\frac{5}{9}$ of £4 10s. 4½d. + $1\frac{7}{11}$ of £2 7s. 8d.
d. s. d. s. d.
= $\frac{3}{5} \times \frac{135}{1}$ + 5 × 10 0½ + 18 × 4 4.
= 6s. 9d. + £2 10s. 2½d. + £3 18s.
= £6 14s. 11½d. Ans.

s. d.
3. $\frac{3\ \ 3\frac{1}{2}}{11\ \ 1}$; $\frac{330\text{ yds.}}{1\frac{1}{2}\text{ m.}}$; $\frac{5\frac{1}{4}\text{ hrs.}}{330\text{ secs.}}$

= $\frac{39\frac{1}{2}}{133}$; = $\frac{1\frac{1}{2}\text{ f.}}{12\text{ f.}}$; = $\frac{5\frac{1}{4}\text{ hrs.}}{5\frac{1}{2}\text{ m.}}$

= $\frac{79}{266}$; = $\frac{1}{8}$; = $\frac{315}{5\frac{1}{2}}$

= $\frac{630}{11}$

= $57\frac{3}{11}$

4. Affix ciphers to the numerator, and divide the numerator by the denominator till there is no remainder, or till the figures in the quotient recur. Mark off as many decimal places beginning at the right hand as there have been added ciphers to the dividend.

(*a*) $\frac{3}{40} = \frac{75}{1000} = \underline{\cdot 075}$. Ans.

(*b*) $\frac{9}{1600} = \frac{5625}{1000000} = \underline{\cdot 005625}$. Ans.

Three whole numbers = three thousand thousandths. This, divided by 40, gives 75 thousandths or ·075. Similarly in example (*b*).

Grammar.

(*Answer questions 1 and 2 and one other question.*)

1.
See the wretch *that long has tossed*
On the thorny bed of pain,
At length *repair his* vigour *lost*
And breathe and walk again :
The meanest floweret of the vale,
The simplest note *that swells the gale*,
The common sun, the air, the skies,
To him are opening *Paradise.*

Express in your own words the meaning of this passage.

2 Analyse the first four lines.

3. Parse the words in italic.

4. Explain, by reference to the prefixes or affixes, the meanings of the following words; and put each word into a sentence of your own construction :—

Revert. Congregation. Submarine. Beautify.
Victorious. Gratitude.

(1) Look at the poor man who for a great length of time has been confined to his room with pain and sickness! When his strength has returned sufficiently to enable him to walk abroad, the simplest flower that blows, the song of the homeliest bird, the sun, the air, the skies, give him such delight as to make him think he has entered Paradise.

(2) (*a*) See the wretch at length repair his vigour lost and breathe and walk again : Principal sentence.

(*b*) That long has tossed on the thorny bed of pain : Adjective sentence, qualifying wretch.

(*a*) *Subj.*—[You]
Pred.—see
Obj.—the wretch (direct)
repair his vigour lost and breathe and walk again at length (indirect).

(*b*) *Subj.*—that
Pred.—has tossed
Ext. of Pred.—long (time) on the thorny bed of pain (place).

(3) *See*—verb, irreg., trans., act., imp., 2nd, sing. or plural, agreeing with its nom. 'you.'
that—rel.-pro., masc., 3rd, sing., relating to 'wretch,' nom. case to 'has tossed.'
long—adv. of time modifying 'has tossed.'
has—aux. to 'tossed,' indicating perf. tense.
tossed—past part. of 'to toss,' referring to 'that.'
has tossed—verb, reg, intrans., act., ind., perf., 3rd, sing., agreeing with its nom. 'that.'
repair—verb, reg., trans., act., inf., pres., gov. by 'see.'
his—pers. pronoun, masc., sing., 3rd, poss. case, gov. by 'vigour.'
lost—participial adj. qual. 'vigour.'
that—rel. pronoun, neut., sing., 3rd, referring to 'note,' nom. case to 'swells.'
swells—verb, reg., intrans., act., ind., pres., 3rd, sing., agreeing with its nom. 'that.'
gale—com. noun, neut., sing., obj., gov. by 'on' understood.
to—prep., showing relation between 'him' and 'are.'
him—pers. pro., masc., 3rd, sing., obj. case, gov. by 'to.'
Paradise—com. noun, used as a proper noun, neuter, sing., nom. case after 'are.'

(4) *Revert*—to turn back. He will revert to his old practices.
Congregation—a number meeting together. The congregation was very large.
Submarine—under the sea. The submarine cable was laid many years ago.
Beautify—to make beautiful, to adorn. She will try to beautify the house.
Victorious—having gained the victory. He was the leader of the victorious army.
Gratitude—state of being thankful. He was full of gratitude.

END OF THIRD YEAR.

Euclid.

MALES ONLY.

[All generally understood abbreviations and symbols for *words* may be used, but not symbols of operation, such as −, +, ×.]

(*Answer two questions, including Question 3, if you can do so.*)

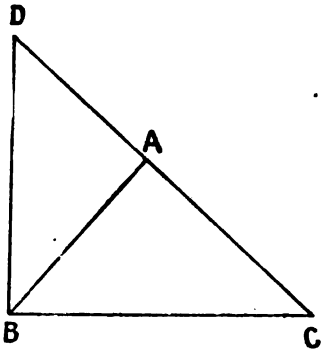
1. If a straight line falling on two other straight lines make the exterior angle equal to the interior and opposite angle on the same side of the line ; or make the interior angles on the same side together equal to two right angles ; the two straight lines shall be parallel to one another.

(Euclid, Book I., 28.)

2. To describe a parallelogram that shall be equal to a given triangle, and have one of its angles equal to a given rectilineal angle.

(Euclid, Book I., 42.)

3. If the base angle of an isosceles triangle be one-fourth of the vertical angle, and from it a line be drawn perpendicular to the base to meet the opposite side produced, then the part produced, the perpendicular, and the remaining side, will form an equilateral triangle.



Let ABC be an isosceles triangle having ∠ A = four times ∠ B. At B erect BD perpendicular to BC, and produce CA to meet BD in D. Then ABD is an equilateral.

Because the three interior ∠s of any △ = two right ∠s, and ∠ BAC = 4 times ∠ ABC or ACB.
∴ ∠ BAC = $\frac{4}{6}$ or $\frac{2}{3}$ of two right ∠s.
But ∠ DAB BAC = two right ∠s.
∴ ∠ DAB = one third of two right ∠s.
And DBC is a right ∠ (Const.) and ABC is $\frac{1}{6}$ of two right ∠s, *i.e.*, $\frac{1}{3}$ of a right ∠.
∴ ∠ DBA is $\frac{2}{3}$ of a right ∠.
And remaining ∠ BDA of triangle BDA is $\frac{2}{3}$ of a right ∠.
∴ △ DBA is equiangular. It is ∴ equilateral.

Q. E. D.

Algebra.

MALES ONLY.

(*Answer three questions only, including Question 4, if you can do so.*)

1. *Prove* that $a - (b - c) = a - b + c$.

If I give away a shillings out of a purse containing b pounds and c sixpences, how many shillings have I left?

2. Divide $a^8 - b^8$ by $a^3 + a^2b + ab^2 + b^3$, and resolve your answer into factors.

3. Find the G.C.M. of $2x^2 - x - 1$ and $2x^2 + x - 3$, and simplify—

$$\frac{5}{2x^2 + x - 3} - \frac{3}{2x^2 - x - 1}$$

4. Give an example of an *identical* equation, and solve the equations :—

$$(1)\ \frac{2x + \cdot0625}{2\cdot5} - \frac{x - \cdot125}{\cdot75} + \frac{7}{8} = 0;$$

$$(2)\ \frac{x - 5}{2} = \frac{(x - 2)^2}{2x - 5}$$

1. If I subtract b from a, I have taken away c too much, for it is not b which has to be subtracted, but the difference between b and c.

I must therefore add an amount equal to c in return for subtracting c too much, *i.e.*,

$$a - (b - c) = a - b + c$$

(£b + c sixpences) − a shillings

$= \left(20b + \frac{c}{2} - a\right)$sh.

$= (40b + c - 2a)$sh. Ans.

2. $a^3+a^2b+ab^2+b^3)\ a^8-b^8\ (a^5-a^4b+ab^4-b^5$

$a^8 + a^7b + a^6b^2 + a^5b^3$

$-a^7b-a^6b^2-a^5b^3$

$-a^7b-a^6b^2-a^5b^3-a^4b^4$

a^4b^4

$a^4b^4 + a^3b^5 + a^2b^6 + ab^7$

$- a^3b^5 - a^2b^6 - ab^7 - b^8$

$- a^3b^5 - a^2b^6 - ab^7 - b^8$

$a^5 - a^4b + ab^4 - b^5 = \underline{(a - b)\ (a^4 + b^4)}$

3. $2x^2 - x - 1,\quad 2x^2 + x - 3$

$= (2x + 1)(x-1),\quad (2x + 3)(x-1)$

$(2x + 1)$ and $(2x + 3)$ are prime to each other

∴ G.C.M. $= \underline{x - 1}$ Ans.

$$\frac{5}{2x^2 + x - 3} - \frac{3}{2x^2 - x - 1}$$

$$= \frac{5(2x + 1) - 3(2x + 3)}{(2x + 1)(2x + 3)(x - 1)}$$

$$= \frac{4x - 4}{(2x + 1)(2x + 3)(x - 1)}$$

$$= \frac{4}{(2x + 1)(2x + 3)} \text{ Ans.}$$

4. An identical equation :

$$(x + a)(x + b) = x^2 + (a + b)x + ab$$

$$(1)\ \frac{2x + \cdot0625}{2\cdot5} - \frac{x - \cdot125}{\cdot75} + \frac{7}{8} = 0$$

Mult. by 3000

$2400x + 75 - 4000x + 500 + 2625 = 0$

$- 1600x = - 3200$

$x = \underline{2}$ Ans.

$$(2)\ \frac{x - 5}{2} = \frac{(x - 2)^2}{2x - 5}$$

$(2x - 5)(x-5) = 2(x^2 - 4x + 4)$

$2x^2 - 15x + 25 = 2x^2 - 8x + 8$

$- 7x = - 17$

$x = \underline{2\frac{3}{7}}$. Ans.

Arithmetic.

(*Answer three questions only, including the last, if you can.*)

FEMALES ONLY.

1. How many articles can be bought for £102 4s. $1\frac{3}{4}$d. if 901 articles cost £100 8s. $5\frac{3}{4}$d. ?

2. Reduce £5 6s. 9d. to the decimal of £1000, and $12\frac{1}{4}$ lbs. to the decimal of $8\frac{3}{4}$ tons.

3. Divide £9 11s. 9d. into 3 parts, which shall be to each other in the ratio $3\frac{1}{3}$, $4\frac{1}{4}$, $5\frac{1}{5}$.

4. Multiply 35·04 by 75, and divide 4·5 by ·015 ; work the latter sum by Vulgar Fractions so as to prove the rule for placing the decimal point in the quotient.

	£ s. d.		£ s. d.		Art.		Art.	
(1)	100 8 $5\frac{3}{4}$	:	102 4 $1\frac{3}{4}$	::	901	:	917.	Ans.

(2) £5 6s. 9d. to dec. of £1000.

12 | 9

20 | 6·75

1000 | 5·3375

·0053375. Ans.

$12\frac{1}{4}$ lbs. to dec. of $8\frac{3}{4}$ tons.

$$\frac{12\frac{1}{4}}{8\frac{3}{4}} = \frac{49 \text{ lbs.}}{35 \text{ tons}} = \frac{7 \text{ lbs.}}{5 \text{ tons}}$$

$$= \frac{1\cdot4}{2240} \text{ lbs.}$$

$$= \frac{1}{1600} = \underline{\cdot000625}.\ \text{Ans.}$$

(3) $3\frac{1}{3} + 4\frac{1}{4} + 5\frac{1}{5} = 12\frac{47}{60}$.

				£ s. d.		£ s. d.	
$12\frac{47}{60}$	:	$3\frac{1}{3}$	::	9 11 9	:	2 10 0.	Ans.
$12\frac{47}{60}$	:	$4\frac{1}{4}$	::	9 11 9	:	3 3 9.	Ans.
$12\frac{47}{60}$	:	$5\frac{1}{5}$	::	9 11 9	:	3 18 0.	Ans.

(4). 35·04

75

17520

24528

2628·00 Ans.

·015)4·500(300. Ans.

4500

$4\cdot5 \div \cdot015$

$= \frac{45}{10} \times \frac{1000}{15}$

$= \underline{300.}$ Ans.

MALES ONLY.

1. If the wages of 311 men for 29 days be £413 7s. 5d., what should be the wages of 457 men for 10 days?

2. What principal will produce as simple interest £322 17s. 6d. in 7 years at $4\frac{1}{2}$ per cent. per annum ?

3. Divide the average of $3\frac{1}{4}$ of £5, $5\frac{1}{8}$ of £6, $1\frac{1}{4}$ of £29, by the average of 1·5, ·15, ·015.

4. Find the square root of 4624 and 63504. Show in the former case that the process is based upon the algebraic formula $(a + b)^2 = a^2 + 2ab + b^2$.

					£ s. d.		£ s. d.	
(1)	Men,	311 : 457		::	413 7 5	:	209 9 2.	Ans.
	Days,	29 : 10						

(2) £100 produces $7 \times 4\frac{1}{2}$ = £$31\frac{1}{2}$.

£		£ s. d.		£		£	
$31\frac{1}{2}$	:	322 17 6	::	100	:	1025.	Ans.

$$(3)\ \frac{3\frac{1}{4} \text{ of £}5 + 5\frac{1}{8} \text{ of £}6 + 1\frac{1}{4} \text{ of £}29}{3} \div \frac{1\cdot5 + \cdot15 + \cdot015}{3}$$

$= \frac{13}{4} \times 5 + \frac{41}{8} \times 6 + \frac{5}{4} \times 29 \div 1\cdot665$

$= \frac{65}{4} + \frac{246}{8} + \frac{145}{4} \div 1\cdot665$

$= \frac{666}{8} \div 1\cdot665$

$= 83\cdot25 \div 1\cdot665$

$= \underline{£50.}$ Ans.

(4) 4624(68. Ans.

36

128)1024

1024

63504(252. Ans.

4

45)235

225

502)1004

1004

$68 = 60 + 8$

Let $a = 60\quad b = 8$

Then $(a^2 + b^2) = a^2 + 2ab + b^2$

That is $(60 + 8)^2 = 60^2 + 2(60 \times 8) + 8$

$= 3600 + 960 + 64$

$= 4624$

Mensuration.

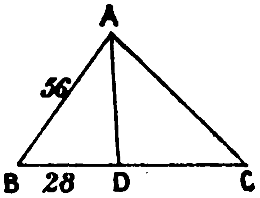
MALES ONLY.

(*Answer one question.*)

1. Find, in poles, the area of an equilateral triangle whose side is 56 yards.

2. A man, walking at the rate of $2\frac{1}{2}$ miles an hour, takes fifteen minutes to walk round a rectangular field, one side of which is two-thirds of the other side. Find the area of the field in acres.

1.



$\sqrt{(56 + 28)\,(56 - 28)}$
$= 48\cdot497$ AD.
$48\cdot497 \times 28 \div 30\frac{1}{4}$
$= \underline{44\cdot9}$ nearly. Ans.

2. $2\frac{1}{2}$ miles per hour
$= \dfrac{2\frac{1}{2}}{4} = \frac{5}{8}$ m. in 15 mins.
$\therefore$ two sides $= \frac{5}{16}$ m.
The proportion $= 2 : 3$
$\therefore$ the sides are $\frac{2}{16}$ m. and $\frac{3}{16}$ m. respectively,
or 220 yds. and 330 yds.
$220 \times 330 \div 4840 = \underline{15 \text{ acres.}}$ Ans.

Grammar.

(Answer three questions only.)

THE CLOUD.

1. I *bring* fresh showers for the *thirsting* flowers,
 From the seas and the streams ;
I bear light shade for the leaves *when laid*
 In their noonday dreams :
From my wings *are shaken* the dews that *waken*
 The sweet birds *every one*,
When *rocked* to rest on *their* mother's breast,
 As she dances about the sun.
I am the *daughter* of the earth and water,
 And the nursling of the sky ;
I pass through the pores of the ocean and shores,
 I change but I *cannot die*.

Paraphrase these lines, and point out what examples are to be found in them of figurative language.

2. Parse the words printed in italic.

3. Analyse the six lines from the *third* to the *eighth* inclusive.

4. Say which of the following words are of Latin, and which are of purely English origin, and give in each case another example of a word similarly formed :—Integrity, Brethren, Executrix, Wisdom, Wealth, Justice, Fortify, Happiness, Preceptor, Manhood.

(1) I am the bearer of refreshing rain from the seas and the streams to the flowers drooping from the heat of the sun. I throw a welcome shadow over the leaves unruffled by the breeze. The dews that revive the whole of the young birds in their nests, gently covered by their mothers' wings, are part of my substance. I am produced by the earth and the water, and brought up by the sky. I come through the smallest of places in the seas and the land. I am never long the same, but I never die.

Nearly the whole of the poem is figurative. The flowers are represented as thirsting like human beings; the leaves are called dreamers ; the cloud is as a bird with wings, and a daughter born of parents and brought up by a nurse.

(2) *Bring*—verb, irreg., trans., act., ind., pres., 1st sing., agreeing with its nom. 'I.'
thirsting—participial adj. of quality, qualifying flowers.
when—advl. conj., joining the two sents. 'I bear, &c.' and 'They are laid, &c.'
laid—past part. of 'to lie,' referring to 'they' und. and forming with *are* und. the pres. ind. passive of 'to lie.'
are—aux. verb to 'shaken,' indicating pass. voice.
shaken—past part. of the verb 'to shake,' referring to 'dews.'
are shaken—verb, irreg., trans., passive, ind., pres., 3rd plur., agreeing with its nom. 'dews.'
waken—verb, irreg., trans., act., ind., pres., 3rd plur., agreeing with its nom. 'that.'
every—distrib. adj. pro., 3rd sing.
one—numl. adj., qual. 'bird.'
every one—compound distrib. adj. pro., 3rd sing., obj. case, in appos. with 'birds.'
rocked—past part. of the verb 'to rock,' refg. to 'they' und. and forming with *are* und. the pres., ind., passive of 'to rock.'
their—pers. pro., com., plur., 3rd poss., govd. by 'mother's.'
daughter—com. noun, fem., sing., 3rd, nom. after 'am.'
can—aux. verb to 'die,' indicating pot. mood.
not—adv. of negation modifying 'can die.'
die—verb, reg., intrans., infin., gov. by 'can.'
can die—verb, reg., intrans., act., pot., pres., 1st sing., agreeing with its nom. 'I.'

Note.—If you have been taught to discard the potential mood, then parse 'can' fully as a principal verb, and do not parse 'can' and 'die' together.

(3) (*a*) Principal sentence.
Subj.—I
Pred.—bear
Obj.—light shade (dir.) for the leaves (ind.)

(*b*) Adverbial sentence to *a* (time)
Connective—When
Subj.—[they]
Pred.—[are] laid
Ind. Obj.—in their dreams (place).

(*c*) Principal sentence.
Subj.—The dews
Pred.—are shaken
Exten. of Pred.—from my wings (place).

(*d*) Adj. sentence to *dews* in *c*.
Subj.—That
Pred.—waken
Obj.—the sweet birds every one.

(*e*) Adverbial sentence to *d* (time).
Connective—When
Subj.—[they]
Pred.—[are] rocked
Obj.—to rest (indirect)
Exten. of Pred.—on their mother's breast (place).

(*f*) Adverbial sentence to *e* (time).
Connective—As
Subj.—she
Pred.—dances
Exten. of Pred.—about the sun (place).

(4)

Latin.	*Other Example*
Integrity	sincerity
Executrix	administratrix
Justice	malice
Fortify	magnify
Preceptor	acceptor
English	
Brethren	children
Wisdom	freedom
Wealth	health
Happiness (Icelandic)	clumsiness
Manhood	childhood

END OF FOURTH YEAR.

Euclid.

MALES ONLY.

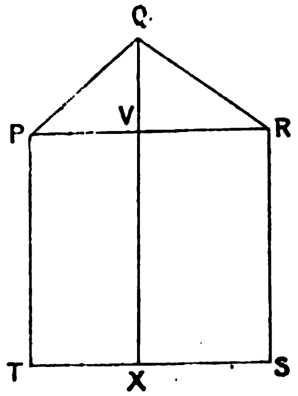
[All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operation*, such as —, +, ×.]

(Answer two questions, including question 3, if you can do so.)

1. If a straight line be divided into any two parts, the squares on the whole line and on one of the parts, are equal to twice the rectangle contained by the whole and that part, together with the square on the other part.
Euclid, Book II., 7.

2. In every triangle, the square on the side subtending an acute angle is less than the squares on the sides containing that angle by twice the rectangle contained by either of those sides and the straight line intercepted between the perpendicular let fall upon it from the opposite angle, and the acute angle.
Euclid, Book II., 13.

3. PQR is an isosceles triangle right-angled at Q, and on PR is described the square RSTP. Join QS, and prove that the square on it is five times the square on one of the equal sides of the triangle.



Let PQR be given triangle.

On PR describe square PRST.

Join QS. Through Q draw QVX perpendicular to PR.

Then PV = VR (I. 26) and ∠ PQV = ∠ RQV.

∴ Each of them is half a right ∠: and ∠ VRQ is half a right ∠, ∴ QV = VR (I. 6).

Square on QR = squares on QV, VR (I. 47).

∴ Square on QR is double square on VR, *i.e.*, on XS (I. 34).

Again square on QS = squares on QX, XS (I. 47).

And square on QX = nine times the square on VQ or VR.

For (II. 7) square on QX = squares on QV, VX, with twice XV, VQ.

But square on VX = four times square on VR for VX is double VR.

And twice the rectangles XV, VQ also = four times the square on V, R.

To these add square on VQ.

∴ Square on QX = nine times the square on VR or VQ.

To these add square on XS, *i.e.*, VR.

∴ Squares on QX, XS = ten times square on VR.

But squares on QX, XS = square on QS.

∴ Square on QS = ten times square on VR.

And square on QR is twice square on VR.

∴ Square on QS is five times square on QR.

Q. E. D.

Mensuration.

MALES ONLY.

(*Answer one question only.*)

1. The frame of a looking-glass is 5 ft. 4 in. long and 4 ft. wide (outside measure); find the dimensions of the glass when the area is equal to that of the frame.

2. Find (in acres) the area of a circular ring whose inner diameter is 9 chains 45 links, and outer diameter 12 chains 25 links. ($\pi = \frac{22}{7}$.)

(1) Area of glass and frame = $5\frac{1}{3} \times 4 = 21\frac{1}{3}$,
∴ Area of glass = $10\frac{2}{3}$ ft.
Let x = width of frame.
Then, $(5\frac{1}{3} - 2x)(4 - 2x) = 10\frac{2}{3}$.
$$21\frac{1}{3} - 18\frac{2}{3}x + 4x^2 = 10\frac{2}{3}$$
$$x^2 - 4\frac{2}{3}x + 5\frac{1}{3} = 2\frac{2}{3}$$
$$x^2 - 4\frac{2}{3}x + (\tfrac{7}{3})^2 = -\tfrac{8}{3} + \tfrac{49}{9} \text{ or } \tfrac{25}{9}$$
$$x - \tfrac{7}{3} = \pm\tfrac{5}{3}$$
$x = \frac{2}{3}$ ft. or 8 in.
∴ Length = 5 ft. − 1 ft. 4″ = 4 ft.
Breadth = 4 ft. − 1 ft. 4″ = 2 ft. 8 in.

(2) Outer radius = $\frac{1225}{2}$ = 612·5 links.
Inner ,, = $\frac{945}{2}$ = 472·5 ,,
Their sum = 1085. Their diff. = 140
$1085 \times 140 \times \frac{22}{7}$ = 477400 links
= 4·774 acres. Ans.

Arithmetic.

(*Answer three questions only, including the last, if you can.*)

FEMALES ONLY.

1. After deducting $2\frac{1}{2}$ per cent. from a bill, the sum paid was £2 2s. 3d.; what was the amount of the bill?

2. A man buys into a certain Stock at $100\frac{3}{4}$, and sells out at $100\frac{1}{8}$, and loses £96; how much of the Stock did he buy? [Neglect brokerage.]

3. Divide £730 9s. $3\frac{1}{2}$d. between A, B, C, so that C shall have three times as much as B, and B three times as much as A.

4. What is meant by saying that $\cdot\dot{7} = \frac{7}{9}$? Find the difference between $\cdot 3\dot{7}$ of £4 10s. and $\cdot 3\dot{7}$ of £4 19s.

(1) $97\frac{1}{2}$: 100 :: £2 2s. 3d. : £2 3s. 4d. Ans.

(2) Loss on $100\frac{3}{4} = 100\frac{3}{4} - 100\frac{1}{8} = \frac{5}{8}$.
∴ $\frac{5}{8}$: £96 :: $100\frac{3}{4}$: £15360 worth. Ans.

(3) For every 1 share A has, B will have 3, and C 9. Total shares 13.

		£	s.	d.		£	s.	d.	
13 : 1	::	730	9	$3\frac{1}{2}$	:	56	3	$9\frac{1}{2}$	A.
13 : 3	::	730	9	$3\frac{1}{2}$	:	168	11	$4\frac{1}{2}$	B.
13 : 9	::	730	9	$3\frac{1}{2}$	:	505	14	$1\frac{1}{2}$	C.

(4) $\frac{1}{9} = \cdot\dot{1}$ ∴ $\frac{7}{9} = \cdot\dot{7}$
$\cdot 3\dot{7}$ of £4 19s. − $\cdot 3\dot{7}$ of £4 10s.
$= \frac{37}{99} \times \frac{99}{1} - \frac{37-3}{90} \times \frac{90}{1}$
= 37s. − 34s.
= 3 shillings. Ans.

MALES ONLY.

(*Answer three questions only, including the last if you can.*)

1. How many cubic feet of lead, $\frac{1}{15}$ of an inch thick, will be required to cover the steps of a staircase composed of 50 steps, each step being 2 feet long and 8 inches wide?

2. Of 5,000,000 scholars liable to attend school, if 25 per cent. are absent on Monday morning, 15 per cent. on Monday afternoon, Tuesday morning and afternoon, and Wednesday morning, 20 per cent. on Wednesday afternoon, Thursday morning and afternoon, and 30 per cent. on Friday morning and afternoon, what is the average number present for each of the ten attendances?

3. What principal will amount to £578 16s. 3d. in 3 years, at 5 per cent. per annum compound interest?

4. Find the cube root of 10,648 and of 188,132,517, and show in the former case that the process for extraction of a cube root is based upon the Algebraic formula

$$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3.$$

(1) $50 \times 2 \times \frac{2}{3} \times \frac{2}{15 \times 12} = \frac{20}{27}$ cub. ft. Ans.

(2) $(25 + 15 + 15 + 15 + 15 + 20 + 20 + 20 + 30 + 30) \div 10$
= $20\frac{1}{2}$ average °/₀ of absentees
$20\frac{1}{2}$ °/₀ of 5,000,000 = 1,025,000
∴ 5,000,000 − 1,025,000 = 3,975,000. Ans.

(3)

	£			
	1	1st year's		principal
5 °/₀ =	·05	,,	,,	interest
	1·05	2nd	,,	principal
5 °/₀ =	·0525	,,	,,	interest
	1·1025	3rd	,,	principal
5 °/₀ =	·055125	,,	,,	interest
	1·157625	Amount of £1 in 3 years		

£1·157625 : £578·8125 :: £1 : £500. Ans.

(4)

$$\begin{array}{rrr}
 & & 10648(22.\ \text{Ans.}\\
 & 2^3 = & \underline{8}\\
2^2\times 300 = & 1200 & 2648\\
2\times 30\times 2 = & 120 & \\
2^2 = & \underline{4} & \\
 & \underline{1324} & \underline{2648}
\end{array}$$

$$\begin{array}{rrr}
 & & 188,132,517(573.\ \text{Ans.}\\
 & 5^3 = & \underline{125}\\
5^2\times 300 = & 7500 & 63132\\
5\times 30\times 7 = & 1050 & \\
7^2 = & \underline{49} & \\
 & \underline{8599} & \underline{60193}\\
 & & 2939517\\
57^2\times 300 = & 974700 & \\
57\times 30\times 3 = & 5130 & \\
3^2 = & \underline{9} & \\
 & \underline{979839} & \underline{2939517}
\end{array}$$

$(a + b)^3 = a^3 + 3a^2b + 3a^2b^2 + b^3$

Let a = tens. b = units

Then $20^3 = 8000$. $10648 - 8000 = 2648$.

Now 2648 should contain $3.20.2^2 + 3.20.2^2 + 2^2$

The method gives $\begin{array}{r}\\+\\+\end{array}\left(\begin{array}{l}3.20.20\\3.20.\ \ 2\\2.2\end{array}\right)2 = 1324.2 = \underline{2648}.$

Grammar.

BOYS AND GIRLS.

(*Answer questions* 1 *and* 4 *and one other question.*)

1. But *'tis* a common *proof*
That lowliness is young ambition's ladder,
Whereto the climber upwards turns his face,
But when he *once* attains the upmost round,
He then unto the ladder turns his back,
Looks in the clouds, *scorning* the base degrees
By which he did ascend. So Cæsar may:
Then *lest he may*, prevent. [And since the quarrel
Will bear no colour for the thing he is,
Fashion it thus; that what he is, augmented
Would run to these and these extremities :]
And therefore think him as a serpent's egg,
Which *hatched* would, as his kind, *grow mischievous*,
And kill him in the shell.

Express in your own words the substance of the first eight lines of this passage, down to the word 'prevent.'

2. Select from the passage any words which you know to be of Latin origin, and give their meanings and derivations.

3. Analyse the passage enclosed within brackets.

4. Parse the words printed in italic.

5. Who were the chief English writers living in the time of Queen Elizabeth? Give a brief account of any one book of the Elizabethan period, of which you know most.

(1) Everyone is aware that the person who is eager for power uses the mask of humility as a means of attaining his end, ever practising that virtue till he has reached the goal he aimed at. When once he has succeeded he discards the character he had assumed, and takes no more notice of the things which he has used to aid him in his ascent. It is quite possible that Cæsar may adopt such a method, and lest he should do so, let us hinder him in his attempt.

(2) LATIN WORDS. MEANINGS AND DERIVATIONS.

Proof—test, result obtained by trying; from *probo*.
ambition—desire for power, &c., the going about seeking for power; from *ambio*, *ambi*, about, and *eo*, *itum*, to go.
attains—touches; reaches; secures; from *ad*, to, and *tango*, to touch.
basis—a step, a foundation; from *banio*, to step.
degrees—steps; from *de*, down, and *gradus*, a step.
ascend—to climb; from *a*, to, and *scando*, to climb.
prevent—to go before so as to hinder; from *pre*, before, and *venio*, to come.
quarrel—complaint, dispute, brawl; from *queror*, to complain.
fashion—the form, appearance, or cut of a thing; from *facio*, to make.
colour—hue, appearance; from *color*.
augmented—increased; from *augeo*, to increase.
extremities—utmost limits; from *exter*, outward; superlative, *extremus*.
serpent—a creeping animal; from *serpeo*, to creep.
mischievous—evil; from *mis*, ill, and *caput*, the head.

(3) (*a*) Principal sentence.
Subj.—[You.]
Pred.—fashion.
Obj.—it.
Ext of Pred—thus (manner).

(*b*) Adverbial sentence (reason) to *a*.
Connec.—since.
Subj.—the quarrel.
Pred.—will bear.
Obj.—no colour (dir.) for the thing (ind.).

(*c*) Adjective sentence to *thing* in *b*
Subj.—he.
Pred.—is [which].

(*d*) Noun sentence in app. with *it* (*c*).
Connect.—that
Subj.—[that thing] (included in *what*) augmented
Pred.—would run
Obj.—to these and these extremities (ind.)

(*e*) Adjective sent. to *thing* in *d*.
Subj.—he.
Pred.—is [which].

(4) *'tis*=it is.
it—pers. pro., neut., sing., 3rd, nomin. to 'is.'
is—verb, irreg., intr., act., ind., pres., 3rd, sing., agreeing with its nom. 'it.'
proof—abst. noun, neut., sing., nom. after 'is.'
that—cop. conj., joining the two sentences 'It is a proof' and 'Lowliness is, &c.'
whereto—advl. conj., joining the sentences 'Lowliness is, &c.,' and 'The climber turns, &c.'
scorning—pres. part. of the verb 'to scorn,' referring to 'he.'
lest—advl. conj. joining the two sentences 'You prevent' and 'he may scorn.'
he—pers. pro., masc., 3rd, sing., nom. to 'may scorn.'
may—aux. verb to 'scorn,' indicating pot. mood, used for the subjunctive.
hatched—past part. of 'to hatch,' referring to 'egg.'
grow—verb, irreg., intrans., act. inf., pres., gov. by 'would.'
mischievous—adj. of quality, qualifying 'serpent.'

(5) William Shakespere, Lord Bacon, Sir Walter Raleigh, Edmund Spencer, Sir Philip Sidney, Ben Jonson, Christopher Marlowe, Richard Hooker, Roger Ascham, William Camden.

Perhaps the book I know best among those written by the above writers is 'Shakespere's Works.' He wrote thirty-seven plays, which may be divided into tragedies, comedies, and historical plays. Of these the greatest tragedies are, perhaps, *Hamlet*, *King Lear*, and *Macbeth*; the best historical plays are *Richard III.* and *Julius Cæsar*; and the finest comedies are *Midsummer Night's Dream* and *As you like it*. Those which are most commonly acted in the present day are *Hamlet*, *Richard III.*, *Merchant of Venice*, and *As you like it*. Besides plays he wrote many poems, the chief of which are *Venus and Adonis*, *Tarquin and Lucrece*, and upwards of one hundred and fifty sonnets. In his works Shakespere displays a great amount of knowledge of men and things; he uses a very large vocabulary; has an infinite power of expression; and displays the utmost skill in depicting the minds and characters of those whom he makes the chief actors in his plays. His works are for all men and for all time.

Algebra.

MALES ONLY.

(*Answer three questions, including questions* 1 *and* 4, *if you can.*)

1. Show that the product of two expressions is equal to the product of their greatest common measure and least common multiple.

Find the G.C.M. of

$6a^4b - 17a^3b^2 + 14a^2b^3 - 3ab^4$, and $2a^4 + 3a^3b - 9a^2b^2$.

2. Prove that $(a^m)^n = a^{mn}$, where m and n are positive integers.

Find the square root of $4a^4 - 12a^3 + 29a^2 - 30a + 25$.

3. Express $5ab^2c^3$ as a fraction whose denominator is $5a^3b^2c$; and simplify—

$$\left(\frac{3a-2x}{3a^2-2x^2}-\frac{2a-3x}{2a^2-3x^2}\right)\div\frac{5ax(a-x)}{3a^2-2x^2}.$$

4. Solve the equations:—

$$(1)\ \begin{cases}13x-11y=49.\\13y-11x=25.\end{cases}$$
$$(2)\ 3x^2-51x+216=0.$$

(1) The G.C.M. is the greatest factor common to both expressions.

The L.C.M. is the product of the numbers after the common factors have been taken away.

∴ the product of the two numbers is the product of their G.C.M. and L.C.M. Example:

$$a-b,\ a^4-b^4$$

are two expressions. Their G.C.M. is $a-b$. Their L.C.M. is a^4-b^4. ∴ product of two expressions = L.C.M. × G.C.M.

$$6a^4b-17a^3b^2+14a^2b^3-3ab^4,\text{ and }2a^4+3a^3b-9a^2b^2.$$

From the first take away the factor b, not common to both, leaving $6a^4-17a^3b+14a^2b^2-3ab^3$ and $2a^4+3a^3b-9a^2b^2$.

Resolved into factors these are $(2a^2-3ab)(3a^2-4ab-b^2)$ and $(2a^2-3ab)(a^2+3ab)$.

Then G.C.M. = $\underline{2a^2-3ab}$. Ans.

$$\begin{aligned}(2)\ (a^m)^n &= a^m\times a^m\ \ldots\ldots\text{ to the }n^{\text{th}}\text{ power}\\&= a^m\text{ taken }n\text{ times}\\&= a^{mn}.\end{aligned}$$

$$\begin{array}{lrl}(3) & & 4a^4-12a^3+29a^2-30a+25(2a^2-3a\times 5\\ & & 4a^4\\ 4a^2-3a) & & -12a^3+29a^2\\ & & -12a^3+\ \ 9a^2\\ 4a^2-6a+5) & & \quad 20a^2-30a+25\\ & & \quad \underline{20a^2-30a+25}\end{array}$$

$$5ab^2c^3\times\frac{5a^3b^2c}{5a^3b^2c}=\frac{25a^4b^4c^4}{\underline{5a^3b^2c}}.\ \text{Ans.}$$

$$\left(\frac{3a-2x}{3a^2-2x^2}-\frac{2a-3x}{2a^2-3x^2}\right)\div\frac{5ax(a-x)}{3a^2-2x^2}$$
$$=\frac{(2a^2-3x^2)(3a-2x)-(3a^2-2x^2)(2a-3x)}{(3a^2-2x^2)(2a^2-3x^2)}\times\frac{3a^2-2x^2}{5ax(a-x)}$$
$$=\frac{-5ax^2+5a^2x}{(3a^2-2x^2)(2a^2-3x^2)}\times\frac{3a^2-2x^2}{5ax(a-x)}$$
$$=\frac{1}{\underline{2a^2-3x^2}}.\ \text{Ans.}$$

$$\begin{array}{rrl}(4)\ (1) & 13x-11y &= 49\\ & 13y-11x &= 25\\ \text{Adding} & 2x+2y &= 74\text{ or }x+y=37\\ \text{Subtracting} & 24x-24y &= 24\text{ or }\underline{x-y=\ \ 1}\\ & & \qquad\text{Adding }2x=38\\ & & \qquad\qquad x=\underline{19}.\ \text{Ans.}\\ & & \qquad 19-y=\ \ 1\\ & & \qquad\qquad y=\underline{18}.\ \text{Ans.}\end{array}$$

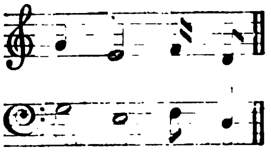
$$\begin{aligned}(2)\ 3x^2-51x+216&=0\\ x^2-17x&=-72\\ x^2-17x+\left(\tfrac{17}{2}\right)^2&=-72+\tfrac{289}{4}\text{ or }\tfrac{1}{4}\\ x-\tfrac{17}{2}&=\pm\tfrac{1}{2}\\ x&=\pm\tfrac{1}{2}+\tfrac{17}{2}\\ x&=\underline{9}\text{ or }\underline{8}.\ \text{Ans.}\end{aligned}$$

END OF FIRST YEAR.

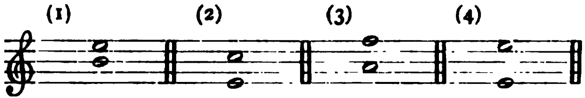
Music.

STAFF NOTATION.

1. Write the following an octave lower on the Bass clef, doubling the value of every note:—

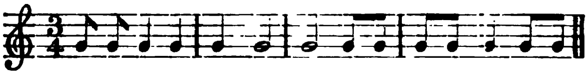


2. Write below each of the following intervals its name (major second, &c.):—



Major or perfect fourth. Minor sixth. Minor sixth. Octave.

3. Add bars to the following in accordance with the time-signature:—



TONIC SOL-FA NOTATION.

1. State what measures are shown by the following pulse-signs:—

(1) | : : ¦ : : ‖

(2) : | : | : ‖

(1) Three-pulse. (2) Four-pulse secondary.

2. Write the names of the following intervals:—

(1) *soh* to *doh*¹. Major or perfect fourth.
(2) *me* to *doh*¹. Minor sixth.
(3) *te* to *fah*¹. Minor or diminished fifth.
(4) *me* to *me*¹. Octave.

3. Write the following an octave lower, halving the value of each note:—

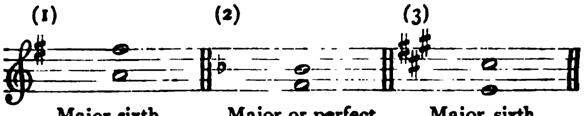
| s :— | d' :— | t :— | — :— | m' :— | d' :— ‖

| s_1 :d ¦ t_1 :— | m :d

END OF SECOND YEAR.

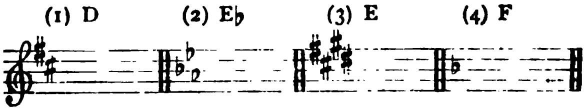
STAFF NOTATION.

1. Write below each of the following intervals its name (major third, &c.):—

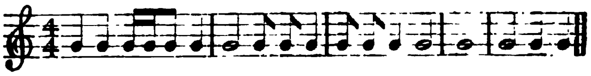


Major sixth. Major or perfect fourth. Major sixth.

2. Write the signatures of the following major keys (treble clef):—



3. Add bars to the following in accordance with the time-signature:—



TONIC SOL-FA NOTATION.

1. What are the mental effects of (1) *fah*, (2) *ray*, (3) *lah*?

(1) Grave, expectant. (2) Prayerful, expectant. (3) Sad, mournful.

2. Write the names of the following intervals:—

(1) *fah* to *ray*¹. Major sixth.
(2) *soh* to *fah*¹. Minor seventh.
(3) *doh* to *te*. Major seventh.
(4) *me* to *ray*¹. Minor seventh.

3. State what measures are shown by the following pulse-signs:—

(1) | : : | : : ||

(2) : | ¦ : | : ¦ : ||

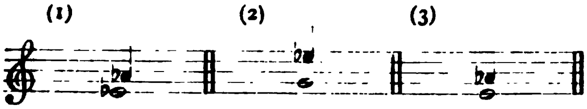
(3) ¦ : : | : : | : : ¦

(1) Six-pulse. (2) Four-pulse. (3) Nine-pulse.

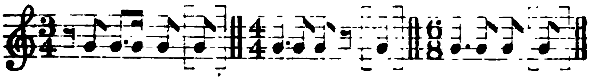
END OF THIRD YEAR.

STAFF NOTATION.

1. Write above (1) a perfect or major fourth, above (2) a minor sixth, above (3) a minor third.



2. Complete each of the following bars by adding one note at the end:—



3. State (briefly) the meanings of the following terms:—

(1) Legato.	In a bound, connected manner.
(2) Dal Segno.	Return to the sign.
(3) Allegro.	Quickly.
(4) Ritard.	Slacken the pace.

TONIC SOL-FA NOTATION.

1. Write a major sixth above each of the following notes:—(1) Above *fah—ray*¹. (2) Above *lah—fe*¹. (3) *te*¹*—se*.

2. Write (in figures) over each note and rest in the following passage its value in pulses or fractions of a pulse:—

1 ½ ½ ½ ½ 1 ¾ ¼ 1 1 1 2

| s :– .l | s .d¹ : t | d¹ .,s : f | m : ¦ d :– ¦

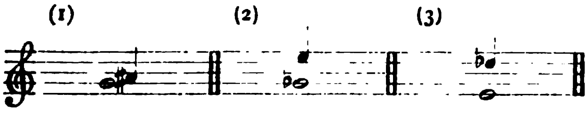
3. State (briefly) the meanings of the following terms:—

(1) Legato.	In a bound, connected manner.
(2) Dal Segno.	Return to the sign.
(3) Allegro.	Quickly.
(4) Ritard.	Slacken the pace.

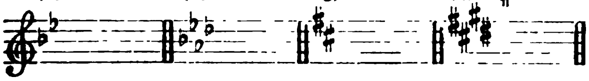
END OF FOURTH YEAR.

STAFF NOTATION.

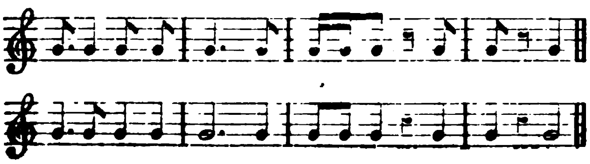
1. Write above (1) an augmented second, above (2) an augmented sixth, and above (3) a diminished seventh:—



2. What minor keys are shown by the following signatures? (1) G minor. (2) F minor. (3) B minor. (4) C♯ minor.



3. Re-write the following, doubling the value of every note and rest:—



TONIC SOL-FA NOTATION.

1. Write an augmented fifth above each of the following:—(1) *doh—se*. (2) *fah—de*¹. (3) *soh—re*¹.

2. In the minor mode (1) what is the minor or essential sixth, and (2) the minor or occasional seventh? (1) *fah*. (2) *soh*.

3. Re-write the following, doubling the value of each note and rest:—

| s .m : f .,l ¦ r .m,f : s ¦

| s : m | f :– .l | r : m.f | s :– ||

Science Notes.

ONE of the most remarkable experiments hitherto performed has been the transplanting of a portion of a nerve from a living rabbit to a human subject. The illustrious and learned doctor upon whom the operation was performed is doing well.

⁂

Dr. GUPPY and others are impressed with the possibility of the diffusion of the seeds of plants by birds. It is recommended that the crops of birds shot at sea in high latitudes should be examined. with a view of finding whether seeds are actually conveyed by that means in any great numbers. This may not explain all the difficulties that at present beset the question of the distribution of plants in the southern hemisphere, but at the same time it is confidently believed in some quarters that it may throw a good deal of light upon an intricate question.

⁂

We learn from *Nature* that at the last conversazione of the Royal Society there was an unusually splendid display of experiments and demonstrations. Among the most striking and interesting were the experiments with soap bubbles shown by Mr. C. V. Boys, who also exhibited his Radio-micrometer, an instrument much more delicate than the thermopyle. The experiments with the soap bubbles were designed to show the power of an air film to prevent two air bubbles from coming into real contact. The outer of two bubbles may be pulled out until it squeezes the inner one into a long oval, but no real contact takes place. An inner bubble filled with gas will carry up an outer one, to which are attached a wire and other things, without really touching it at all. A bubble will roll down a spiral groove also made of soap film, or jump one or two steps at a time down a spiral staircase made of soap film, without touching the spiral film or being injured in the least.

Sections and specimens illustrating the recent borings in the delta of the Nile were exhibited by Professor Judd, F.R.S. The whole of the samples obtained from these borings have now reached the Royal Society, and the examination reveals some facts of great geological interest. The alternations and mixtures of blown sand and Nile alluvium were found to continue down to the depth of 121 feet below the surface, or about 95 feet below the level of the Mediterranean. At that depth a remarkable change in the deposits took place, and beds of gravel containing both pebbles and sub-angular fragments of quartzite and compact limestone and some metamorphic and igneous rocks were found, and similar bed occur at intervals down to the greatest depth reached. Up to the present time no contemporaneous organic remains have been found in these deposits.

⁂

A MOST instructive paper on Head growth in students at the University of Cambridge has been recently read. The measurements have been taken during the last three years. The maximum length and breadth of the brain have been measured, and its height above a specified plane. The product of these three quantities has been taken to represent the brain volume of the student.

The products thus obtained are classified as referring (A) to high class honour men; (B) the remaining honour men; and (C) the 'poll' men.

Ages.	Class A.	Class B.	Class C.
19	241·9	237·1	229·1
20	244·2	237·9	235·1
21	241·0	236·4	240·2
22	248·1	241·7	240·0
23	244·6	239·9	235·0
24	245·8	251·2	244·4
25 & upwards	249·9	239·1	243·5

Dr. Venn draws four conclusions from his figures.

I. Although it is pretty well ascertained that in the masses of the population the brain ceases to grow after the age of 19, or even earlier, it is by no means so with University students.

II. That men that have obtained high honours have had considerably larger brains than others at the age of 19.

III. That they have larger brains than others, but not to the same extent, at the age of 25. In fact their predominance is by that time diminished to one-half of what it was.

IV. Consequently high honour men are presumably as a class both more precocious and more gifted throughout than others. We must therefore look upon eminent University success as a fortunate combination of these two helpful conditions.

⁂

THE London Geological Field Class, under the direction of Professor H. G. Seeley began the summer excursions on Whit Monday, May 21st, and will continue them on Saturday afternoons thereafter up to July 14. The following are among the places which will be visited: Leatherhead and Boxhill, to examine the gore of the Mole in Chalk; Maidstone and the vicinity for gravels; Woolwich and Reading for beds of chalk, gault, and lower greensand; Erith and Crayford for river gravels; Northfleet and Oxted for studies in chalk. Intending students should apply at once for tickets as only a limited number will be issued. Applications should be made to W. P. Collins, 157, Great Portland-street.

⁂

FOR those who are interested in African travels, a most interesting work has recently appeared in one volume, by Professor Drummond. It is certain to be very much read and widely circulated.

IN a paper recently read before the Institution of Civil Engineers, Mr. Ellington read a paper on hydraulic power in London, with special reference to the use of lifts. He strongly advocated the use of a simple ram as the safest mode of construction. Suspended lifts depend on the condition of the ropes or chains by which they hang, and are therefore all to a certain extent dangerous.

⁂

A NEW and apparently very valuable process of extracting the alkaloids from Cinchona bark, by means of oil, has been perfected by Dr. King, the superintendent of the Sikkim plantation. This will in all probability lead to a permanent reduction in the price of quinine.

⁂

THE new instrument currented and perfected by Mr. C. V. Boys, called the Radio-micrometer, consists essentially of thermo-electrical circuit, formed of a bar of antimony and bismuth, of small sectional area, the ends being formed by a loop of copper wire, and suspended in a strong magnetic field by an exceedingly finely drawn torsion fibre.

Publications Reviewed.

Technical Education. A Two-fold Protest, Educational and Financial. By J. H. Newbold, B.A. Heywood and Co.

Mr. Newbold needs no introduction to many of the readers of this Journal. His paper, read before the Conference on Education under healthy conditions, held in Manchester in 1885, was afterwards reprinted and circulated all over the country. We remember how the idea of over-pressure was scouted by the officials, from the Vice-President downwards. Some of us, too, remember how carefully they then set themselves to work to reduce it.

Mr. Newbold has now, in a pamphlet of 60 pages, discussed the whole question of technical education. Any contribution to the study of this important subject, from a person competent to deal with it, is most opportune, and no one who reads the pamphlet will doubt the author's ability to write upon it. Mr. Newbold makes a protest, as he says, both upon educational and financial grounds, against stereotyping education by making it conform to a general syllabus, and putting the charge of it upon the rates. He protests against sacrificing general education to the teaching of special branches of it. The pamphlet is so forcibly argued, and so clearly and pleasantly written, that any person to whom this burning question is of any concern will positively thank us for calling attention to it. Mr. Newbold is not an obstructionist. Those who are deeply impressed with the conviction that something must be done to train the hand and cultivate the eye of our elder scholars will not see much to disagree with; while those who are of opinion that any general system of handicraft or manual training must lie altogether outside the present school, and be practically independent of it, will find much to stimulate and encourage them. Not the least piquant pages of the pamphlet are those devoted to a criticism of Professor Huxley's attack on the much-abused pupil teacher. Pupil teachers and students in training have been a good deal 'damned with faint praise.' A few really violent attacks by men of Professor Huxley's standing will do them more good than all the apologies of their friends. Common people will begin to ask themselves whether a system can be radically wrong which has produced a set of men who have done exceedingly well what was demanded of them, and who have not lost thereby their capacity of doing something very different and, in their own opinion, very much better. Professor Huxley must have forgotten that Dr. Fitch and Professor Judd were once students in training; and he will hardly maintain that they are the only two that deserve honourable mention.

It is a good sign when nonsense provokes a smile, by whomsoever it is spoken. The Professor's sense of humour must have forsaken him on the occasion of his visit to Manchester. A boy of fourteen passes in fourteen science subjects at South Kensington, and is rewarded with a National Scholarship. The Dean of the Science School rails at the Whitehall department for 'pouring in' and giving no time to think. This is too much.

But while Mr. Newbold's criticism is fearless, it is essentially good natured. He never loses his temper or his self-control. There is no phase of the education question for the last quarter of a century which Mr. Newbold has not studied, and studied carefully. He writes with a full knowledge of his subject, and we are sure that those who read his pamphlet will feel greatly indebted to him for the clearness and ability with which he has stated his case.

Arithmetic for Beginners: A School Book of Commercial Arithmetic. By the Rev. J. B. Lock, M.A. Macmillan and Co.

Mr. Lock's reputation as an author was made by his text book upon Trigonometry, and it has been increased by his later work on Dynamics. He has now issued a school class book written mainly with a view to meet the requirements of the new examination for commercial certificates. Hence, more prominence is given to exchange and foreign money, and less to recurring decimals. But while, perhaps, specially intended for a specific purpose, the book will be found useful in almost all schools, as it contains enough of theory and abundance of practice. Readers of Mr. Lock's other books will not be surprised at the singular precision and clearness of the statements. The author has three marked qualifications for his work; he is thoroughly master of his subject, he is a successful and experienced teacher, and he has the faculty of literary expression. Few writers of mathematical books combine these qualifications in an equal degree. The printing of the book is most admirable.

We have said there is a chapter on foreign money. Would it not be well to devote two more pages to the decimal system so far as it relates to weight, length, and capacity. It is exceedingly useful, and is becoming more and more so. As a teacher of physics Mr. Lock must be perfectly aware of this. The treatment of the subject on page 77 is too meagre. It must be clearly understood that Arithmetic cannot be exhaustively treated in a book of 170 pages. The teacher will have to add to the illustrations and proofs. As a concise collection of principles, rules, and examples, it is excellent. We have no doubt it will be very largely used. It is an honest and trustworthy book to put into a boy's hands.

Elementary Physiography. By John Thornton, M.A. Longmans, Green and Co. London.

This science subject shows signs of increasing popularity. This is evident, whether we consider the number of students who annually attempt the examination or the number of text books appearing year by year to meet the wants of these pupils. The Manual before us is the most complete of its kind issued. Hitherto students have required to read from several works and frequently considerable difficulty has been experienced in knowing how much of each work to select. This has not been always an evil, for it has made careful teaching and guidance necessary. Mr. Thornton has collected largely from standard works on the many sciences making up the subject of Physiography. The selection of material has been made from the newest and most reliable authorities and the additional matter supplied by the author will be especially valuable for its general accuracy, its logical arrangement and the admirable manner in which it is illustrated. In reading carefully through the work the following corrections are necessary.

1. The Foraminifera would appear to be so named (page 52) because of the numerous holes in each chamber through which the thread-like portions of the animal's body protrude. Now it is the passage which connects the various chambers for which the named is applied.

2. Trachyte is with difficulty settled in its position amongst the igneous rocks. On page 70 the old and oft repeated description is given and this is followed by the statement that *Obsidian* is a variety of Trachyte. Again on page 72 Trachyte is stated to be the volcanic form of Granite. The professor who examines the pupils in Physiography will require them to know that Trachyte is the lava form of syenite and that Rhyolite is the lava form of granite; whilst Obsidian is the glassy form of all lavas except basalt.

3. The origin of Boulder clay is stated on page 174 to be due to glaciers with no reference to ice-cap or ice-sheet conditions.

4. On page 231 we find the following 'In ordinary language the word "day" or civil day means what the astronomer calls a *mean solar day.* This has been described as the average of the *true solar day*, which is the time between two successive meridian passages of the sun.' The author here confounds the civil day (from midnight to midnight) with the astronomical day (from mid-day to mid-day).

5. On page 234, the author states that 'the earth's axis is *perpendicular to the line* joining the centre of the earth and sun.' This fact is made to account for the equality of day and night at the equinoxes. Now it is true, that at the equinoxes, the axis of the earth is in a plane at right angles to the plane of the earth's orbit; a simple model however, would be sufficient to show the class that the axis of the earth is never at right angles to the line joining the centres of the sun and earth.

The work has been got up in excellent style: Drawings from official and other sources have been abundantly introduced; the original sketch on page 113 is poor. The maps are good.

Tildesley's Higher Examination Series. Complete Guide to the London Matriculation Examination. Civil Service Press.

The work contains 60 pages of letterpress, which consist of the regulations of the examination, the requisite text books, hints and instructions, papers set at the examination, and solution of the mathematical questions.

We have looked through the list of text books. Such a list is of course to a certain extent a matter of taste, but it certainly contains some very trustworthy class-books. We were disappointed with the hints. A 'complete guide' which, under the head of hints and instructions, gives less than six lines to French, can hardly be considered satisfactory. We cannot see much to help a student in these instructions, nor do we consider that the book at all corresponds to its title.

Every Man his own Art Critic at the Manchester Exhibition. By Patrick Geddes. London and Manchester; John Heywood.

Although this little pamphlet might from its title be supposed to be of purely local and ephemeral interest, there is much in its contents deserving of more extended and lasting application. The author has taken the really magnificent display of pictures at the Manchester Exhibition last year as a peg on which to hang a sketch of the principles which in his opinion should guide us in appraising the qualifications—good, bad, or indifferent—of pictorial works of art. Although we are of course unable now by actual inspection to verify the correctness of the strictures or praises passed on many of the pictures then exhibited, we remember some of the works referred to sufficiently well to be able to endorse some of the opinions advanced. We may be perhaps too Philistine to be able quite to sympathise with the author in his enthusiastic examination of the gradations of colour, the delicacy of treatment and the balance of form, on which he at times dilates, but at any rate we appreciate his efforts to explain to the general public the elementary canons of art criticism sufficiently well to be able to say that his little pamphlet contains much that is interesting to the casual visitor to any picture gallery and much that is likely to be of use to those who are now and then called upon to act professionally as art critics.

Test Exercises in Algebra. London and Edinburgh: W. and R. Chambers.

Messrs. Chambers have published the Test Exercises just added to their Standard Algebra in a separate pamphlet under the above name. The tests are sixty-four in number, embracing four, five, or six examples in each, which cover the work of the schedule as far as quadratic equations. The tests are chiefly mechanical, and are reasonably difficult for the pupils for whom they are intended.

Geography of the British Isles. By Archibald Geikie, LL.D. London: Macmillan and Co.

This is an excellent little summary of the geography of our islands. The islands are first treated of as a whole, and their size, surface, climate, productions, and other interesting features, described. Then each country is treated in greater detail, a short description of each county and its chief towns being added to the physical features. The style is clear and interesting, and the details are full without being unnaturally burdensome. The figures for areas and population are enclosed in brackets, and can thus be learned or otherwise at the discretion of the teacher.

Dress Cutting Out. By Mrs. Henry Grenfell and Miss Baker. London: Longmans and Co.

Under this title Messrs. Longman have issued in a stout envelope three sheets of squared paper on which are drawn to measurement the patterns of the various parts of the body of a dress.

Full directions are given for taking the measurements necessary for any dress, and after these are taken accurately any female with ordinary intelligence should be able to draw the necessary pattern and cut out for herself a dress which should be a perfect fit. The directions are clear, precise, and unmistakeable, while the drawing is careful and accurate. The Recreative Evening Schools' Association have done well in publishing for their pupils these aids to scientific dress cutting.

Practical Papers in Civil Service Geography. By George E. Skerry, F.R.S.L. London: Simpkin, Marshall and Co. &c.

A number of examination papers in geography set for various branches of the Civil Service, together with practical directions for working an examination paper, methods of study, and specimen answers, make up a pamphlet of 77 pages under the above title. As the questions already given seem to traverse the whole of the physical and political geography of the world in more or less detail, a very simple direction would seem to suffice for all candidates. Such advice would be:—Know thoroughly the whole of the geography of the world and be able to draw any map, and you will be sure to obtain good marks at the Examination. We commend the volume only as we commend others compiled with the same end in view. It gives specimens of the questions set, which will serve for practice to intending candidates. The hints may be of service, but neither hints nor questions will make up for thorough hard study before the examination commences.

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Technical Instruction in Elementary Schools.

BY SIR PHILIP MAGNUS.

V.—SCIENCE TEACHING.

ON the advantage of knowing something of the properties of the different materials by which we are surrounded, and of the laws which regulate the action of the forces which we are constantly endeavouring to control and utilize, it is unnecessary to spend many words. In nearly every action of our lives we are reminded of the services which science renders to our means of living. There can be no longer any question of the necessity of making science teaching an important element of general education. The late Professor Guthrie well said: 'Though a boy may not be intended for an occupation in which science is required, and though he show little or no aptitude for it, it is as unjust to hide science from him as it would be to hide a knowledge of history, or literature, from those who are not intended to become historians or authors.'*

The principles of instruction insisted upon throughout these articles are equally applicable to the teaching of science as of other subjects. Looked at from its disciplinary side, the object of the instruction is to cultivate in the pupil habits of accurate observation, and of close reasoning; and from the utility standpoint, to impart serviceable information and to provide definite training in the methods of investigation applicable to all kinds of inquiries.

If these be the objects of science teaching, they must be kept in view, so far as possible, even in the rudimentary stages of instruction; and we have now to enquire to what extent, and in what way, science can be taught in elementary schools, so as to effect these objects, and at the same time to serve as a preparation for higher technical instruction.

Having regard to the age of the children attending elementary schools, and to the conditions of their home life, which prevent them from gaining much information from their parents with respect to their ordinary surroundings, it is necessary that the school should seek to supply the place of home, and that the teacher should encourage and try to satisfy that spirit of enquiry which is common to all children. It is not desirable that children should commence at a very young age the study of any isolated branch of science, be it Chemistry, Botany, or Mechanics; least of all, that they should try to learn it by such methods as are laid down in any of our approved text-books. Science may become as 'bookish' as any other subject of instruction, if imperfectly taught, and may even yield less intellectual discipline than grammar. The study of science is valueless unless it stimulates accurate observation by bringing the mind constantly into direct communion with external things. The instruction must be of the kind which the Germans call '*Anschauungsunterricht*,' *i.e.*, instruction by means of direct perception, in the properties of things, and in the laws, if any, which connect these properties with one another. The spirit of enquiry common to every young child should be encouraged and directed into channels through which the pupil may obtain some insight into the laws and processes of nature, and some knowledge of the methods by which these laws may be ascertained. It is needless to say that the teacher must throw life into the lessons, that he must possess a much higher knowledge of the subject than he can hope to impart to his pupils, and that he should speak from the results of his own experience and investigations. For this reason, it is most important that the teacher of science, even in elementary schools, should have received a proper scientific training, and should be acquainted with the best methods of instruction. The teaching of elementary science to small children is no doubt more difficult than the teaching of science in its advanced stages to older pupils. As the student progresses he instructs himself, and he avails himself of the services of his teacher or professor as a guide only or referee. In the early stages of education, highly trained teachers are indispensable, and these are equally needed for the proper teaching of science as of other subjects.

As a foundation of technical education, which consists almost entirely of instruction in the application of science and art to different industries, the study of science cannot be commenced too early, and should be continued throughout the whole period of education. 'For, leaving out only some very small classes,' Mr. Herbert Spencer pertinently asks: 'what are all men employed in? They are employed in the production, preparation, and distribution of commodities. And on what does efficiency in the production, preparation, and distribution of commodities depend? It depends on the use of methods fitted to the respective natures of these commodities, it depends on an adequate acquaintance with their physical, chemical or vital properties, as the case may be, that is, it depends on science.'* In order that this science may be profitably taught, and that our elementary school teachers may know not only what to teach but how to teach it, it is necessary that they should have further opportunities than they at present possess of being trained under the best masters.

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* Cantor Lectures on Science Teaching. (Society of Arts, 1886.)

In answer to the question, what to teach? I would say: Some knowledge of the things that immediately surround us—the earth we walk on, the air we breathe, the water we drink, the food we eat, the clothes we wear, the trades we practise. These are the subjects, properly investigated, that should constitute the science lessons in elementary schools. In answer to the question, how to teach them? I would say: By Kindergarten methods, *i.e.*, by means of object-lessons systematically pursued. The pedagogic principle—to proceed from the known to the unknown—furnishes the key to the true method of science teaching.

Taking such subjects as I have indicated as texts, many of the lessons might be made as suitable to one locality as to another; whilst some would have special reference to the geography of the neighbourhood of the school, and to the occupations of the people of the district. In manufacturing towns, a talk about the simpler kinds of machinery in common use might lead up to a study of the rudimentary principles of mechanics, whilst in schools situated in rural districts lessons on agricultural practice might prepare the way for the systematic study of elementary chemistry. The teachers being competent, and possessing a wide knowledge, and some enthusiasm in the pursuit of science, the lessons ought not to be regulated by any fixed code, nor should the value of the teaching be assessed by the results of any definitely arranged system of examination. Indeed, considerable latitude should be given to teachers and to school authorities; but it is important that the teaching should be based on some fixed principles, by which it might be made the means, not only of imparting useful information about a variety of common things, but of leading, by sure and regular steps, to a knowledge of the simple facts and laws of one or more branches of science; and it would, therefore, be desirable that the methods and results of the teaching should be carefully inspected by competent judges.

Under the headings above indicated the paths are very numerous along which the springs of pure science may be approached. As the complex phenomena that present themselves to the senses are stripped of their accidental circumstances, and the laws underlying them laid bare, these laws should be demonstrated by simple experiments, which it should be the endeavour of the teacher to associate in the pupil's mind with the description of the object under consideration. It is only in this way that science teaching can be made to yield that most important of all educational exercises, the discipline of careful reasoning.

The late Professor Guthrie in the suggestive series of Cantor Lectures, from which I have quoted, indicates the broad lines upon which such object-lessons should be given, and illustrates them by reference to the 'stuffs' that are met with in the building of a house. After considering concrete, sandstone, coal, and other stuffs used in house building, he says: 'The method of obtaining a light leads to the interesting and instructive subject of matches, and the stuffs of which they are made. Perhaps, here, the heat produced by friction may be examined, and so a foretaste obtained of the great doctrine of the mutual relationship of the forces, the indestructibility of energy—the doctrine not second in importance to that of the elementary constitution of matter.' The temptation, however, to pass on too rapidly from the observation of the properties of things, the explanation of their uses, and the causes underlying those uses, to the great generalisations of science has to be carefully guarded against. In science culture as in house building there are many courses between the foundation and the roof.

Of object-lessons, Mr. Herbert Spencer well says: 'They should not be limited to the contents of the house, but should include those of the fields, and hedges, the quarry, and the seashore. They should not cease with early childhood, but should be so kept during youth as insensibly to emerge into the investigations of the naturalist and the man of science.' The difficulty of arranging systematic object-lessons, so as to make them the means of teaching the rudimentary principles of science, is well pointed out by Professor Bain, in his excellent work on the 'Science of Education.' 'It is possible,' he tells us, 'by means of the object to approach the primary sciences, namely, Physics, Chemistry, and the rest, with the view of explaining matter and motion, gravity, heat and light; but the manner of doing so needs the gravest consideration.' Object-lessons, leading up to the study of natural history, are undoubtedly a most valuable part of elementary education, and are generally found to be most serviceable in stimulating observation among young children; and for this reason they may well form part of the science teaching in all schools. Moreover, in rural districts, and as a preparation for agricultural education, they have a special value of their own. But I am now more directly concerned with science teaching as a part of technical instruction; and for this purpose it is necessary that the object-lessons should be directed towards the ultimate study of the elementary principles of physical science. For the ordinary student there are doubtless advantages in the studying of physical science by the regular systematic methods as laid down in science text books. But, for the young pupil, the case is different. Nevertheless, there are so many advantages in following the regular order that Mr. Bain is right in saying that 'the teacher should always be looking forward to the time when the advancing intelligence makes that possible, and further, he should tacitly keep this order in this mind even when working on the seemingly desultory plan.'

Nearly all writers on education are at one as to the value of object-lessons in teaching the first rudiments of science. The difficulty occurs in finding teachers who are capable of so arranging a series of lessons as to prepare the way for the systematic study of any one branch or science. As regards method there is general agreement, and few would be found to dissent from Rousseau, who, in his 'Emile,' tells us: 'Dans la recherche des lois de la nature commencez toujours par les phénomènes les plus communs et les plus sensibles.'

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* 'Education,' by Herbert Spencer.

It is easier to point out what should not, than what should constitute a good object-lesson. Of the examples of such lessons that have been published, many serve their most useful purpose in indicating what the practical teacher should avoid. We should guard against the error of making the lessons too desultory or a mere verbal explanation of terms. Certain fixed principles which should dominate the lesson ought always to be present to the teacher's mind, and perhaps the main purpose of the teacher in these lessons should be 'to guide, rectify, direct and forward' the spontaneous powers of observation and reasoning which all children exhibit. It must be remembered that the aim of science teaching in elementary schools is not to make specialists in science any more than it is the object of workshop instruction to make tradesmen. The real difficulty of the object-lesson consists in the attempt to explain all that the object suggests, and at the same time to keep in view the scientific principles which the lesson ought ultimately to bring out. The full explanation of all the phenomena which are associated with any single natural object demands a knowledge of many different branches of Science. In order to avoid exuberance of explanation, and a too desultory treatment of the matter, the teacher, who should be in full mental sympathy with his pupils, knowing clearly how much, or, rather, how little they can understand, must aim steadily at eliminating some single physical law, which afterwards he should endeavour experimentally to prove. Whilst scientific information is doubtless interesting and of considerable value to the pupil, what is educationally important is to train the child in the methods of science. Starting from the same object the teacher may arrive at a simple fact or law in Chemistry, Heat, Dynamics, or some other branch of science. From the very outset, however, he should have clearly in view the goal he desires to reach, and he must avoid the temptation to explain too much. Just as the anatomist in dissecting a limb picks out a particular muscle and demonstrates its function, so the science teacher must try to show the operation of a single law in the bundle of complex phenomena that may be presented to him; and the law having been evolved the teacher should proceed to prove it by rudimentary experimental methods. In this way, by a proper choice of subjects, a few of the leading facts of Chemistry, Physics, and Mechanics may be imparted to children by means of explanations of things with which they are familiar, and a good basis may thus be laid for more advanced and more systematic science teaching.

For science teaching, such as I have attempted to describe, some amount of apparatus is needed, but the apparatus should be of the simplest character, and the pupils themselves should, as far as possible, be employed in constructing it, utilising the skill they may be expected to have acquired in their workshop classes. It matters very little that the apparatus employed is rough and simple. The pupil will learn more of scientific method by registering the result of his own experiments with apparatus he has himself made, than by seeing any number of successful experiments performed by his teacher. On this point Rousseau may again be quoted. After expressing his dissatisfaction with the ordinary methods of teaching science, he says: 'L'air scientifique tue la science......Je veux que nous fassions nous-mêmes toutes nos machines...... J'aime mieux que nos instruments ne soient point si parfaits et si justes, et que nous ayons des idées plus nettes de ce qu'ils doivent être, et des operations qui doivent en résulter. Pour ma première leçon de statique, au lieu d'aller chercher des balances, je mets un bâton en travers sur le dos d'une chaise, je mesure la longueur des deux parties du bâton en équilibre, j'ajoute de part et d'autre des poids, tantôt egaux, tantôt inégaux; et, le tirant ou le poussant autant qu'il est nécessaire, je trouve enfin que l'équilibre résulte d'une proportion réciproque entre la quantité des poids et la longueur des leviers.' And again: '*Sans contredit ou prend des notions bien plus claires et bien plus sûres des choses qu'on apprend ainsi de soi-même, que de celles qu'on tient des enseignements d autrui.*'* In this sentence Rousseau sounds the key note of the true educational method, but in its application to science the pupil may proceed somewhat further than may have been thought possible a century ago.

In order that the pupil may fully realize the results of his own simple experiments, he may, even at this early stage of his scientific progress, learn the use of squared paper for graphically expressing the relation between two varying and dependent factors. Dr. Wormell, in the preface to a little book on 'Plotting,' points out that 'although the educational methods which are associated with the name of Fröbel have been brought very near to perfection in the Kindergarten, they are to a great extent suspended when the pupil passes from the infant school.' The use of squared paper in designing patterns is well known in Kindergarten exercises, and also in the experimental science classes of technical schools. It might be made to serve equally useful purposes in the teaching of rudimentary science in elementary schools. If we take a simple pully experiment, as an example, the pupil might easily note the exact weights that balance each other in different trials, and then by registering the results see how nearly he could arrive at the theoretical law. After a time, the pupil would succeed in obtaining the true law for the apparatus in use, and the divergence of this law from the theoretic law might yield useful suggestions for other lesssons. Other simple experiments might lead to the graphical representation of the law of falling bodies, and to the relation between the pressure and volume of a gas under constant temperature. But such instruction would necessarily be restricted to the highest standards, and might, perhaps, be more appropriately given in schools of a higher grade.

To provide every elementary school, having upper standards, with a teacher competent to give scientific instruction on the lines I have indicated, and with the necessary apparatus, might be considered as involving an unjustifiable expenditure of public funds. In Birmingham, Liverpool, and recently in London, a very successful attempt has been made to overcome this difficulty by appointing a teacher of high attainments, with a wide knowledge of his subject, and skilled in the methods of instruction, to go round from school to school, and to give science lectures to the children and their teachers. This peripatetic philosopher carries with him his apparatus, and visits in turn all the chief schools of the town or district. The experiments are carefully prepared at the central depôt, and the lessons are given once a week or once a fortnight. Nothing could exceed the interest which these lessons arouse. Nevertheless, the system, notwithstanding the economy of teaching power, has many drawbacks, and ought to be regarded as temporary only, to be discontinued as soon as the ordinary school teachers shall be as well qualified to teach science as history or grammar. What is true of the workshop instructor is still more true of the science teacher, viz., that he should not be a specialist having no share in the general education of the child, but one of the ordinary class teachers. We may take it for granted, as pointed out by Dr. Butler, of New York, 'that any subject which is taught by a special teacher is regarded as an excrescence on the regular curriculum, and as not standing on the same level with reading, writing and arithmetic.'*

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* Emile, Livre III.

Another defect of the system is, that the children are not made sufficiently familiar with the apparatus which is used in the experimental lectures. Of the ordinary science teachers of the present day, it has been said: 'As a rule, even now, the teacher stands before a blackboard and behind a row of bottles and chalks, and talks and mixes, and calls it chemistry, or involves himself in a tangle of wires and brass and ebonite fittings, and calls it electricity.' The itinerant teacher is at a still greater disadvantage. He brings with him the apparatus required to illustrate his demonstrations, but, unfortunately, he takes it away again, and the children are apt to look upon his experiments as clever tricks which *he* may be able to perform but which *they* cannot. To learn science properly the pupil must himself perform the experiments. He needs to be brought not only face to face, but into hand to hand contact, with nature's operations. It is in the practice of science that its chief value lies. A repetition of the lesson by one of the teachers would be very serviceable if the experiments could also be repeated, and if the children could take part in them; but otherwise there is a want of reality about the teaching which deprives it of some of its educational value. The advantage, however, of such instruction in awakening the intelligence and of stimulating a spirit of scientific enquiry, even if the method of teaching is not as perfect as it might be, cannot be over-estimated.

Systematic science teaching by experimental methods can be given only in the highest standards of Elementary Schools; and there is much to be said in favour of drafting the children of these standards into higher Elementary or Graded Schools, where the more expensive fittings and apparatus which are needed for practical teaching can be more economically provided.

I have now indicated some of the changes needed in our Elementary teaching to make it a more fitting preparation than it is at present for subsequent Technical Instruction. There is reason to hope that many of the suggestions contained in these articles will be embodied in the recommendations of the Royal Commissioners appointed to enquire into the working of the Education Acts, whose Report will probably be presented to Parliament before this article is published. Except as regards workshop instruction, and possibly as regards that also, nearly all the suggestions I have made are in every way as applicable to girls as to boys. The analogy between needlework and woodwork has been frequently pointed out; but in addition to needlework girls even now receive what may be regarded as Technical Instruction in cookery and domestic economy. But as regards our future artizans, no great improvement can be effected in their education and in their fitness to engage in the several crafts and occupations on which the industrial progress of the country so greatly depends, unless the instruction which they receive in our elementary schools is practical in character, and based on the now generally recognised educational principle, that the child must be intellectually stimulated, not so much by literary studies as by bringing his mind, through the medium of his hands and eyes, into direct contact with the objects that surround him.

Pestalozzi.

BY THE REV. CANON WARBURTON, M.A.,

Formerly Her Majesty's Inspector of Training Colleges for Schoolmistresses.

CHAPTER IV.—*continued.*

'1821.

'Pestalozzi completed this day his 76th year. His grey hair, his careworn countenance, his hollow eye and bent figure, proclaim that many days, and those days of trouble, have passed over his head. His heart, however, seems still young—the same warm and active benevolence, the same unconquerable hope, the same undoubting confidence, the same generous self-abandonment animate it now, that have led to the many sacrifices and have supported him under the many difficulties and trials of his eventful life. In a thousand little traits of character, which unconsciously escape him, I read the confirmation of his history. It is an affecting sight when the venerable object of the admiration of emperors and princes appears in the midst of his adopted children. Rich and poor, natives and foreigners alike, share his paternal caress and regard him with the same fearless attachment.

'From the sacrifice of home, property, and health for the benefit of a people who do not understand his merit, to the picking up of a child's plaything or the soothing of an infant's sorrow, Pestalozzi is ever prompt to obey the call of humanity and kindness. The sentiment of love reigns so powerfully in his heart, that acts of the highest benevolence or of the most condescending good nature seem to require no effort, but appear the spontaneous manifestations of the one overruling principle.

'I must tell you an anecdote which, simple as it is, shows at once the warmth and the weakness which characterize his benevolence. He was going to visit some friends at Berne, furnished with as much money as he was likely, under such circumstances, to want. According to his usual practice, he falls into conversation with the first peasant to whom he has an opportunity of speaking. He inquires into his means of subsistence, the number of his children, the wants and distresses of his family, and so forth. Becoming interested in the man's little story, Pestalozzi gives him the larger portion of the money which he has about him. A similar case soon afterwards presents itself, and the second *rencontre* drains his pocket of the last *kreutzer.*[*] He had nearly reached Berne, when a wretched-looking mendicant comes up to him soliciting relief. Again he fumbles in his pocket, but it is now in vain. What is to be done? He remembers that his buckles are of silver; he hastily takes them from his shoes, thrusts them into the beggar's hand, and drives off.

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* Report of President of 'Industrial Education Association.' May, 1888. New York.

'Though regarded in Germany as the most extraordinary luminary, and the profoundest practical philosopher of the age; though honoured with the most flattering testimonies of esteem and approbation by courts and universities, Pestalozzi is the most modest and unassuming of men. To all who take an interest in his method of education he addresses himself in the most touching expressions of gratitude, as if they conferred the greatest obligation by examining into the truth of his opinions and the utility of his plans.

'Never shall I forget my first introduction to him. He had been long expecting me, and his lively imagination had anticipated in different manners the probable results of our connection. "Will he like me? Do you think I shall suit him?" were questions he was perpetually putting to our common friend. I had no sooner arrived than he hurried to meet me, and though I understood not the words he uttered,[†] yet the tone of kindness, the affectionate pressure of the hand, the expression of benignity which lit up his countenance, all assured me I was welcome. Twenty times he rose from his seat, paced with quick, but shuffling step across the room; then, as if suddenly recollecting himself, hastened to place himself near me, to press once more both my hands in his, and to mutter some unintelligible expressions of goodwill.

'In one of the first conversations we had together, he told me how delighted he was that the English began to pay attention to his system, remarking that that union of exalted sentiments with practical good sense which characterizes the nation renders it the most competent to appreciate and execute his plans. "Examine my method," continued he, with his noble candour, "adopt what you find to be good, and reject what you cannot approve. We are doing something here towards the execution of my principles of education, but what we do is still very imperfect: it is in England that my views will be eventually realized."

'You cannot conceive the interest which Pestalozzi awakens, or the influence which he insensibly acquires. All the little barriers behind which reserve or suspicion teach us to intrench ourselves, fall before the childlike simplicity, the unaffected humility, and the feminine tenderness of his heart. Self-interest is shamed into silence while we listen to the aspirations of his boundless benevolence, and if one spark of generous feeling glows in the bosom, the elevated enthusiasm of his character must blow it into a flame. The powers of his original mind serve to maintain the interest which his character first excites. In conversation however, he is most frequently a listener. Towards those with whom he lives in perfect intimacy he sometimes indulges in a playful but forcible raillery—careful, meanwhile to avoid giving the slightest pain or uneasiness. He is peculiarly successful in portraying some great character by two or three masterly strokes: in marking, either in retrospect or by anticipation, the influence of political events on national character or national prosperity; in characterizing the different methods of education in vogue; or in tracing the difference between his (own) views and those of certain philosophers with which they have been confounded.

'There is nothing studied about him. Often as I have heard him enter upon the subject of his system for the information of strangers, I do not recollect him to have taken it up twice from the same point of view. When we have conversed on these subjects, I have sometimes thought his ideas wild and his views impracticable. The faint and misty, but still beautiful light which emanates from his mind I have regarded with a feeling of melancholy delight, for it seemed to indicate that the sun of his genius had set. Still I have been unable to dismiss from my mind his loose and ill digested hints: after frequent reconsiderations of them they have appeared more clear and more feasible, and I have subsequently traced their influence in the opinions I have adopted and in the plans of instruction which I have pursued.

'Pestalozzi once known is never forgotten. I have talked with men who have not seen him for years, or whom the current of events has separated from all intercourse with him. His honoured image lives as fresh in their memory as if their communication had never been suspended or broken. Anecdotes illustrating his benevolence are current in their families, and their children anticipate the delight of one day receiving the parental caress of good Father Pestalozzi. Many of my own countrymen, who have enjoyed the privilege of his society, will, I am sure, carry the remembrance of him to their graves. For myself—his unwearied kindness, his affectionate solicitude for my health and comfort, the numberless testimonies of his esteem and regard which I daily receive, are engraven on my heart in characters which can never be effaced.

'It will ever be a source of proud satisfaction to me that Pestalozzi has honoured me with the title of friend; and should I attain, myself, to a good old age, my decline will be cheered with the remembrance that I have contributed, as he himself declares, to shed a happy serenity over the evening of his life.'

Mr. Mayo appears to have, in the first instance, attached himself to Pestalozzi's staff without any ulterior object; but the idea gradually dawned upon him of first imbuing himself thoroughly with the principles of the great master, and then returning home and establishing a Pestalozzian School in England, free from the oddities, the irregularities, the waste, the dissensions, and, alas! the *dirt,* of the famous Swiss institution. In a letter dated Jan., 1820, he talks of 'setting up a Pestalozzian menagerie of his own.' 'The die,' he writes, Oct., 1820, 'is cast for me: I am a Pestalozzian through life, with no other temporal object but the establishment of this method of education in my own country.' In this idea he was strongly encouraged by Pestalozzi himself, whose great ambition and desire was that his principles should be planted in England, where he thought the conditions peculiarly favourable to their taking root.

When Mr. Mayo left him, Pestalozzi presented to him, among other parting gifts, a screen, now in the possession of Miss Mayo, with a likeness of himself in his own study at Yverdun, and with pictures on the study walls, of Stanz, of 'Gertrude teaching her Children,' and of a green and flourishing tree, representing his own never-dying hope. He also conferred upon Mr Mayo a sort of testimonial, written in German of the most involved and clumsy character possible, which concludes thus:—

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[*] Kreutzer, a German coin worth a little more than a farthing.

[†] The writer did not, at this time, understand German.

'He has, with great readiness, deep insight, and gratifying success, aided me in my pursuit of the main object of my life; in regard to which, by his unprejudiced, calm, and at the same time cordial behaviour, he has attained to a very intimate and thorough familiarity with our purposes, principles, and methods, and especially with the peculiarities of our system of education and instruction. So much has this been the case, that I have long since learned to regard him as a matured and benevolent counsellor in my own domestic concerns.

'I am convinced that, as his presence has proved a blessing to myself and to my house, it will also (through his mature insight into our efforts and his firm conviction of the great and essential advantages which some, at least, of them offer) prove, in time to come, a blessing also to his native land, so wont to embrace with vigour, and promote with liberality, every good movement which comes under its notice. His noble heart cherishes this desire as warmly as his intellect grasps the means of attaining it in all its purity, depth, and manysidedness.

'God be with you, my dear, dear friend! May my heartful thanks, my sincerest affection, and the ardent longing once again to meet you in this world, and once again by your side to indulge hopes which can only be fulfilled beyond the grave, accompany you on your way, and bring you happily home to your fatherland and to the mother whom you love so heartily and so filially, 'PESTALOZZI.

'*Yverdun, Switzerland, April, 8th, 1822.*'

(*To be continued.*)

The Glass of Water; or, Cause and Effect.

(*Comedy in Five Acts.*)

LE VERRE D'EAU; OU, LES EFFETS ET LES CAUSES.

(*Comédie en Cinq Actes.*)

Scene II.—(*continued*).

Bolingbroke.

Qu'y aurait-il d'étonnant?...	What would there be astonishing in that?
La reine Anne, notre charmante souveraine,	Queen Anne, our adorable Sovereign lady,
est une personne fort respectable et fort sage,	is a very respectable and prudent lady,
qui s'ennuie royalement...	who is sovereignly wearied...
je veux dire autant que possible...	I mean as much as possible...
mais à sa cour, on s'amuse beaucoup!...	but at her court, there is much amusement.
toutes nos ladys ont de petits protégés,	All our ladies have their little protégés,
de jeunes officiers fort aimables,	amiable young officers,
qui, sans quitter le palais de Saint-James,	who, without setting foot out of St. James's,
arrivent à des grades supérieurs.	are promoted to high rank.

Masham.

Monsieur!...	Sir!

Bolingbroke.

Fortune d'autant plus flatteuse	A piece of good luck all the more flattering
qu'elle n'est due qu'au mérite personnel.	because it is due to personal merit alone.

Masham.

Ah! c'est une indignité...	Ah! that is a shame!
et si je savais...	If I knew...

Bolingbroke.

[*allant s'asseoir près de la table à gauche.*	[*seating himself at a table on the left*
Après cela...je peux me tromper,	Well...I may be deceived,
et si réellement c'est quelque grand seigneur	and if really it is some great lord
ami de votre père...	your father's friend...
laissez venir les évènements...	let things take their course...
laissez-vous faire!	let them do it for you!
Ah! si on vous ordonnait de vous marier...	Ah! if you were ordered to marry...
je ne dis pas...	that would be another affair...
mais on vous le défend...	but you are forbidden to do so.
il est clair que ce n'est pas un ennemi...	It is plain that it is not an enemy...
au contraire...et lui obéir n'est pas si difficile.	quite the contrary...and to obey is not so difficult.

Masham.

[*debout près du fauteuil où est assis Bolingbroke.*	[*standing near the arm-chair in which Bolingbroke is seated.*
Mais si vraiment...	But I beg your pardon it is...
quand on aime quelqu'un...	when one loves someone
quand on est aimé...	and when one is loved (in return).

Bolingbroke.

J'y suis!...	I see it now!
l'objet de vos rêves!	the subject of your dreams!
la personne à qui vous pensiez tout à l'heure en dormant.	The person about whom you were dreaming just now.

Masham.

Oui, monsieur—la plus aimable,	Yes, sir...the most amiable,
la plus jolie fille de Londres,	the prettiest girl in London,
qui n'a rien...ni moi non plus...	who has nothing...nor I either...
et c'est pour elle que je désire	it is for her that I long for
les honneurs et la richesse...	riches and honours...
j'attends, pour l'épouser,	I am waiting, in order to marry her,
que j'aie fait fortune...	until I have made my fortune...

Bolingbroke.

Vous n'êtes pas encore très-avancé...	You have not made much progress as yet...
et elle de son côté?	and what has she done?

Masham.

Bien moins encore!...	Much less still!...
orpheline comme moi,	an orphan like myself,
demoiselle de boutique dans la Cité,	a shopwoman in the City...
chez un riche joaillier...	in a rich jeweller's shop...
maître Tomwood...	Mr. Tomwood's...

Bolingbroke.

Ah, mon Dieu!	Good heavens!

Masham.

Qui vient de faire banqueroute...	Who is just bankrupt...
Elle se trouve sans place et sans ressource.	She finds herself without a place and without resources.

Bolingbroke.

[*se levant.*	[*rising.*
C est la petite Abigaïl...	It is little Abigail...

Masham.

Vous la connaissez?	Do you know her?

Bolingbroke.

Parbleau, du vivant de ma femme...	Of course I do, during the lifetime of my wife...
je veux dire quand elle vivait près de moi...	I mean when she lived with me...
j'étais un abonné assidu	I was a regular customer
des magasins de Tomwood...	at Tomwood's shops...
ma femme aimait beaucoup les diamants,	my wife was very fond of diamonds
et moi, la bijoutière...	and I liked jewelery...
Vous avez raison, Masham,	You are right, Masham,
une fille charmante, naïve,	she is a charming, artless,
gracieuse, spirituelle...	graceful, clever girl...

Masham.

Eh ! mais, à la manière dont vous en parlez...	Yes, but, from the way in which you speak of her...
est-ce que vous en auriez été amoureux?...	you do not mean to say you were in love with her?

Bolingbroke.

Pendant huit jours ! et peut-être plus !	During eight days ! and perhaps longer !
si je n'avais pas vu	If I had not perceived
que je perdais mon temps...	that I was losing my time...
et je n'en ai pas à perdre...	and I have none to lose (spare)...
maintenant surtout...	now especially...
mais j'ai gardé à cette jeune fille...	but I have retained for that young girl...
une amitié véritable,	a real friendship,
et voici la première fois	and this is the first time
que j'éprouve un regret...	that I feel regret...
non d'avoir perdu ma fortune,	not for having lost my fortune
mais de l'avoir si mal employée...	but for having employed it so badly...
je serais venu à votre aide...	I would have helped you...
je vous aurais mariés...	I would have helped you to marry...
mais pour le présent des dettes,	but at present debts,
des créanciers qui sortent de dessous terre...	creditors who spring up out of the earth...
et pour l'avenir pas même l'espérance...	and for the future not even one hope...
les biens de ma famille reviennent tous	the possessions of my family all revert
à Richard Bolingbroke, mon cousin,	to Richard Bolingbroke, my cousin,
qui n'a pas envie de me les laisser...	who has no wish to leave them to me...
car, par malheur, il est jeune,	for, unfortunately, he is young,
et comme tous les sots	and like all fools
il se porte à merveille...	his health is wonderfully good...
mais nous pourrions peut-être à la cour...	but we might perhaps be able at the Court
chercher pour Abigaïl.	to find something for Abigail.

Masham.

C'est ce que je disais...	Just what I said...
une place de demoiselle de compagnie,	a companion's place,
près de quelque grande dame	with a noble lady,
qui ne soit ni impérieuse, ni hautaine...	who would be neither imperious, nor haughty...

Bolingbroke.

[*secouant la tête.*	[*shaking his head.*
Ce n'est pas aisé à trouver.	It is not easy to find.

Masham.

J'avais pensé à la vieille duchesse	I had thought of the old Duchess
de Northumberland, qui, dit-on,	of Northumberland, who, it is said,
cherche une lectrice.	requires a reader.

Bolingbroke.

Cela vaut mieux...	That's better...
elle n'est qu'ennuyeuse à périr.	she is only tiresome to death.

Masham.

Et j'avais conseillé à Abigail	I had advised Abigail
de se présenter chez elle, ce matin ;	to go and see her this morning ;
mais l'idée seule de venir au palais de la reine	but the bare idea of coming to the Queen's palace
la rendait toute tremblante.	made her tremble.

Bolingbroke.

N'importe...l'espoir de vous y trouver,	No matter...the hope of seeing you here,
elle y viendra ... et tenez... tenez...	she will come...and look ! look !...
monsieur l'officier des gardes,	my gentleman of the guards,
que vous disais-je?...la voici.	what did I tell you?...here she is.

(To be continued.)

Pupil Teacher Examination Papers (Scotland).

31ST MARCH, 1888.

END OF FOURTH YEAR.

FIRST PAPER.

(Two hours and a half allowed for this Paper.)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word 'Parenthetically.'

Write in small hand, as a specimen of copy-setting, the sentence 'In Saxon strength that Abbey frown'd.'

Arithmetic.

MALES.

1. A can do a piece of work in 4 days; B can do it in 6 days; A, B, and C, can do it in $1\frac{1}{2}$ days. In what time could C do it?

(*a*) A can do $\frac{1}{4}$ or $\frac{3}{12}$ in 1 day.
B ,, $\frac{1}{6}$ or $\underline{\frac{2}{12}}$,,
A and B together do $\frac{5}{12}$ in 1 day.

(*b*) Now A, B, and C can do $\frac{1}{1\frac{1}{2}}$ or $\frac{8}{12}$ in one day.

∴ C will do $\frac{8}{12} - \frac{5}{12}$ or $\frac{1}{4}$ in 1 day, and hence the whole in $\underline{\text{4 days.}}$ Ans.

2. Bought paper at 12s.; at what price must I sell it, and give six months' credit at 5 per cent. simple interest, so as to gain 10 per cent.?

(*a*) Interest of 12s. for 6 mos. at 5 per cent. $= \frac{12s. \times 6 \times 5}{1200}$
,, ,, ,, ,, $= \frac{3}{10}$s.
Amount ,, ,, ,, $= 12\frac{3}{10}$s.

(*b*) £100 : £110 :: $12\frac{3}{10}$s. : price required.

$\frac{123s.}{10} \times \frac{110}{100} = \frac{1353}{100} = \underline{13s.\ 6\frac{18}{25}d.}$ Ans.

FEMALES.

1. Explain the terms *rate per cent.*, *Three per Cents.*, *true discount*, *Consols*, *brokerage*.

Rate per cent. is the interest of £100 for one year.

Three per Cents. mean documents in the Government Stocks, *nominally* worth £100, which yield 3 per cent. of interest.

True discount is the difference between the principal and the amount of the principal after a certain time, and at a certain rate per cent.

Consols is short for 'Consolidated,' all the different loans contracted by the Government having been put in large loans according to interest paid.

Brokerage is a small charge per cent. made by stockbrokers on the purchase of Stocks.

2. Find the difference between the simple and compound interest on £520 for 3 years at 5 per cent.

(*a*) Compound interest.

5 °/₀ = $\frac{1}{20}$ of prin. yearly	£520	0	0	prin.	or 1st year.	
$\frac{1}{20}$	26	0	0	int.	,,	,,
	546	0	0	prin.	,,	2nd year.
$\frac{1}{20}$	27	6	0	int.	,,	,,
	573	6	0	prin.	,,	3rd year.
$\frac{1}{20}$	28	13	3·6	int.	,,	,,
	601	19	3·6	amt. at end of 3 yrs.		
	520					
	£81	19	3·6	comp. int. of 3 years.		

(*b*) Simple int. $= \frac{£520 \times 5 \times 3}{100} = \underline{£78}.$

(*c*) Diff. bet. simp. and comp. int. = £81 19s. 3·6d. — £78.
= £3 19s. 3·6d. Ans.

3. If oranges be bought at 10 for a penny, how many should be sold for 2s. 2d. to gain 30 per cent.?

(*a*) 2s. 2d. will purchase 260 when 10 cost 1d.
(*b*) ∴ 100 : 130 :: 260 : number required.

$\frac{260 \text{ oranges} \times 130}{100} = \underline{338.}$ Ans.

4. The total number of forenoon and afternoon attendances made by a class of 60 during a week, with one half-holiday, was 514; find the average attendance for the week, and the per centage absent.

(*a*) 514 divided by 9 (the number of times school has been open) will give the average number in attendance.

$\frac{514}{9} = 57·1$ or $\underline{57}$ av. att. Ans.

(*b*) Possible number of attendances = 60 × 9 = 540.
∴ 540 : 26 :: 100 : per cent. absent.

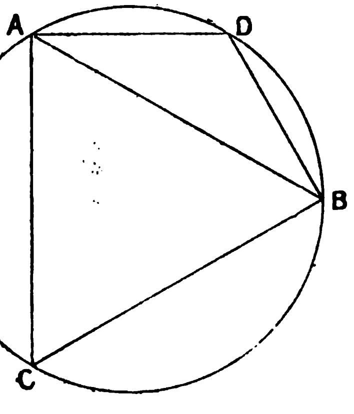
$\frac{26 \times 100}{540} = \underline{4·8 \text{ really } 5 \text{ per cent.}}$ Ans.

Euclid.

1. Parallelograms on the same base and between the same parallels are equal to one another. Bk. I., Prop. 35.

2. The opposite angles of any quadrilateral figure inscribed in a circle are together equal to two right angles. Bk. III., Prop. 22.

3. A triangle is inscribed in a circle; show that the sum of the angles in the three segments exterior to the triangle is equal to four right angles.



Let the triangle ABC be inscribed in the circle ACB.

Let ADB be the angle in one of the segments exterior to the triangle.

By Prop. 22, Bk. III., the angles ADB, ACB are together equal to two right angles. In the same manner any of the angles in the segments together with the opposite angle of the triangle are together equal to two right angles.

That is, the three angles of the triangle together with the three angles in the segments are equal to six right angles. But the angles of the triangle are (I. 32) equal to two right angles, therefore the sum of the angles in the three segments must be equal to four right angles. Q.E.D.

Algebra and Mensuration.

1. Find the value of $(a - b)[x^3 - 2ax^2 + a^2x - (a + b)b^2]$, when $a - b = x = 3$, and $a + b + x = 2$.

By evaluating a, b and x, we get $a = 1$; $b = -2$; and $x = 3$.

$$\therefore (a - b)[x^3 - 2ax^2 + a^2x - (1 + b)b^2] =$$
$$[1 - (-2)][3^3 - 2 \times 1 \times 3^2 + 1^2 \times 3 - (1 - 2)(-2)^2] =$$
$$3[27 - 18 + 3 - (-1)4] =$$
$$3(12 + 4) = \underline{48.} \text{ Ans.}$$

2. Solve the equations :—

(*a*) $\frac{2x}{3} + y = 16$; $x + \frac{y}{4} = 14$.

(*b*) $3x^2 + 7x - 6 = 0$.

(*a*) (1) $\frac{2x}{3} + y = 16$ or $4x + 6y = 96$

(2) $x + \frac{y}{4} = 14$ or $4x + y = 56$

$$5y = 40$$
$$y = \underline{8.} \text{ Ans.}$$

From (2) $x + 2 = 14$ or $x = \underline{12.}$ Ans.

(*b*) $3x^2 + 7x - 6 = 0$

$$x^2 + \frac{7x}{3} = 2$$

Completing sq. $x^2 + \frac{7x}{3} + \frac{49}{36} = 2 + \frac{49}{36} = \frac{121}{36}$

Taking root $x + \frac{7}{6} = \pm \frac{11}{6}$

$x = \pm \frac{11}{6} - \frac{7}{6} = \underline{\frac{2}{3}}$ or $-\underline{3.}$ Ans.

3. The sides of a triangular field are 140, 176, and 300 yards respectively; find its annual value at £5 0s. 10d. per acre.

Half perimeter of triangle = 308

$$\therefore \text{area of triangle} = \sqrt{308 \times 132 \times 168 \times 8}$$
$$= \sqrt{54641664}$$
$$= 7392 \text{ sq. yds.}$$

sq. yds. sq. yds.
∴ 4840 : 7392 :: £5 0s. 10d. : yearly value.

$\frac{1210\text{d.} \times 7392}{4840} = 1848\text{d.} = \underline{£7\ 14\text{s.}}$ Ans.

Grammar.

'Yet O, the *thought*, *that* thou art safe, and *he!*
That thought is joy, *arrive what* may to me.
And, while the wings of fancy still are *free*,
And I can *view* this mimic show of thee,
Time has *but half* succeeded in his theft.—
Thyself removed, thy power to soothe me left.'

1. Analyse the above passage.

2. Parse fully the words in italics.

ANALYSIS.

SENTENCES	KIND	CONNECTIVE	SUBJECT	PREDICATE	OBJECT	EXTENSIONS
1. (Yet O, the thought) that thought is joy	Prin.		that thought	is joy		
2. That thou art safe	subord. noun to (1)	that	thou	art safe		
3. And (that) he (is safe)	subord. noun to (1)	and (that)	he	(is safe)		
4. arrive what may to me	Prin.	what	what (ever)	may arrive	to me (indirect)	
5. and time has but half succeeded in his theft	Prin.	and	time	has succeeded		but half (degree) in his theft (purpose)
6. while the wings of fancy still are free.	subord. adv. to (5)	while	the wings of fancy	are free		still (time)
7. and (while) I can view this mimic show of thee	subord. adv. to (5)	and (while)	I	can view	this mimic show of thee	
8. (Though thou) thyself (be) removed	subord. adv. to (9)	(though)	(thou) thyself	(be) removed		
9. Yet thy power to soothe me (is) left.	Prin.	yet	thy power to soothe me	is left.		

PARSING.

that—subord. conj., introd. subord. noun sent.
Thought—abstr. noun, neut., sing., nom. indep. or subj. of (is).
he—pers. pron., 3rd pers., mas., sing., nom., subj. of (is).
arrive—reg. intrans. verb, infin., pres., gov. by 'may.'
what—indirect interrog. pron. (= whatever), sing., neut., nom. subj. of 'may arrive.'
free—predic. adj., qual. 'wings.'
view—reg. trans. verb, infin., pres., gov. by aux. 'can.'
but—adv. of deg. mod. 'half.'
half—adv. of deg. mod. 'has succeeded.'
thyself—comp. emphat. pers. pron. emphasising (thou), or nom. absol.

Note.—'Thyself removed' might be considered a nom. absolute.

3. From what languages have we received the following words:—cargo, jubilee, ridicule, calico, skipper, cocoa, chemistry, sugar, and dale? Give the root where you can.

WORD.	LANGUAGE.	ROOT.
cargo	Spanish	——
jubilee	Hebrew	——
ridicule	Latin	rideo
calico	Indian	Calicut
skipper	Dutch	schip
cocoa	Portuguese	coco
chemistry	Greek	chemeia
sugar	French	sucre
dale	Saxon	dæl

4. Into what periods may the history of the English Language be conveniently divided? Give the distinguishing features of each.

Dr. Morris divides the history of the English Language into five periods:—

I. English of the First Period (A.D. 450—1100).

(*a*) The grammar of this period is *synthetic* or inflectional, while that of modern English is *analytical.*

(*b*) The vocabulary contains no foreign elements.

(*c*) There was a grammatical gender; substantives were of various declensions, and had five cases; the article was declined; pronouns had a dual number; prepositions governed various cases, and the verb was highly inflected.

II. The English of the Second Period (A.D. 1100 to about 1250).

Changes affecting the *orthography* take place in a general weakening of the terminations of words; older inflections drop off; case endings are discarded; and many simplifications are observed in the southern dialect, while in the other dialects (East and West Midland) even greater simplification is observable; and the influence of Norman-French begins to exhibit itself in the *vocabulary* of the English Language.

III. The English of the Third Period (1250—1350).

Some old inflections are retained in the article; confusion of nouns in gender, number, and case; dual forms of pronouns dropped; *to* before infinitive; final *e* used with adjectives, &c. French words become common especially towards 1350.

IV. The English of the Fourth Period (1350—1460).

The Midland dialect becomes the prevailing one, and northern and southern words still retain their own peculiarities. The plural article sometimes used; the pronouns approach modern forms, and so do verbs. The termination *e* is important from the fact that it represents various inflictions and is used as a mark of the plural or definite adjective, as a mark of adverbs, and as a mark of the infinitive mood, past tense of weak verbs and imperative mood.

Towards the end of this period final *e* becomes irregular, and the northern forms of the pronouns *their, theirs, them,* come into use in the other dialects.

V. The English of the Fifth Period (1460—1520 and 1520 to present time).

Printing is introduced into England by Caxton, and there is a wide diffusion of classical literature.

SECOND PAPER.

Geography.

(*Three hours allowed for this Paper.*)

1. Draw a map of the Gulf of Mexico and the Caribbean Sea, showing the islands. Give one degree of latitude and longitude.

2. Explain why the days are longer in summer than in winter. Show that our division of the year into four seasons does not apply to the whole of the earth's surface.

The north pole of the earth points to the pole-star all through its journey round the sun. At the summer solstice (if a diagram be drawn) it is seen that the inclination of the axis causes the north pole to be fully exposed to the sun; and the sunlit half of the earth includes much more of the northern than of the southern hemisphere. As the earth turns round this sloping axis the north pole and the surrounding parts will continue in sunshine during the entire rotation. Within the Arctic regions the sun will not set, while within the Antarctic regions he will never rise. Anywhere outside the polar regions there will be alternate day and night, but the day and night will not be equal except at the equator. Thus a place in the northern hemisphere will have the day much longer than the night, for it is midsummer; while at the winter solstice when the north pole points away from the sun the very opposite phenomena occur, namely a long night and a short day.

The division of the year will not apply to equatorial regions, for with them there is at least no season corresponding to our winter. The rainy season with them is the only approach to that season. In some of the Pacific Islands there is almost one perpetual spring.

3. Explain the variation in the height of the tidal wave (*a*) at different places, and (*b*) at different phases of the moon.

The great tidal-wave which travels round the earth is an oscillatory wave and not a wave of translation, the water simply rising and falling but not moving onwards. While however this is true of the tidal wave of the ocean, it must be remembered that in narrow seas it becomes converted into an actual wave of translation. Where the channel is contracted, as in a narrow strait, the tide may produce a rapid rush of water, and if it rolls up a narrow estuary the water becomes heaped up and produces a sudden rush into the channel of the river. Such a wave is called a *bore* and is seen in the Bristol Channel at the mouth of the Severn. The original height of the tide-wave is three or four feet, but in some bores the tides are forced up as high as 30, 50, and even to 100 ft. in the Bay of Fundy.

As the sun and moon have both to do with the formation of the tides, when the two come in line and pull together—that is, at full and new moon—the tide is highest and is called *spring tide*: when they are at right angles—that is, at the moon's quarters—the tide is lowest and is *neap tide*.

History.

1. In what reign were the Crowns of England and Ireland united, and in what reign were the Parliaments of Great Britain and Ireland united? Mention the leading circumstances connected with each of these events.

The Crowns of England and Ireland were united in the reign of Henry VIII. Up to that time the kings were styled lords of Ireland. Henry's purpose was to rule Ireland as effectively as he ruled England, and from his accession the Irish lords felt the heavier hand of a master. The Geraldines, who had been suffered to govern Ireland in the name of the Crown, soon discovered that the Crown would no longer be their tool. They resolved to frighten England into a conviction of its helplessness, and a rising ended in discomfiture. The fall of the Geraldines laid Ireland at the mercy of Henry, and in seven years by the conquest of Munster, the submission of Clare, the capture of Athlone, and the victory at Bellahoe, the power of the Crown was acknowledged over the length and breadth of Ireland. Henry's aim was to rule by law and not by force, but the mistake was made of making Ireland English in manners, in law, and in tongue. All government was a copy of English institutions, and every conciliatory measure was tried by Henry to win over the chiefs, and entice them to accept the conditions and titles granted by the English sovereign. The assumption of the title of king of Ireland which followed his quarrel with the Papacy was the fitting crown of the new system. The Parliaments of Great Britain and Ireland were united in the reign of George III., 1801.

In no part of Europe was the evil example of the French Revolution followed so much as in Ireland. Encouraged by the success of the Americans, the 'Volunteers' banded themselves to secure reform in Parliament, but they were dispersed by the skilful tactics of the Government. In 1791 another society, called 'The United Irishmen,' was formed in Belfast for a similar purpose, but it was easily discovered that separation from Britain was meant. The French encouraged them and all seemed ready for an outbreak of rebellion, when the Government, acting on timely information, seized the chiefs, among whom was Lord Edward Fitzgerald. The worst effects of the rising were felt in the south; but General Lake routed the great mass of the rebels at Vinegar Hill, near Enniscorthy. The French sent some 900 troops, who landed at Killala Bay, in Mayo, but they had to surrender in a few weeks (1798).

This rebellion showed the necessity of a closer union with the Empire, and after many debates and much opposition, the union of the Parliaments was accomplished (1801).

2. Name, in order, the chief victories of Nelson. Give a particular account of the battle of Trafalgar, and point out its political results.

Nelson's Chief Victories.

Battle of the Nile, 1798.
Battle of the Baltic, 1801.
Battle of Trafalgar, 1805.

On Monday the 21st of October, when Nelson was near Cape Trafalgar, the enemy was discovered. Nelson told Blackwood, his captain, that he would not be satisfied unless he took twenty of them. Blackwood asked if there was no signal wanting. Nelson replied, that every man knew what they were about. He however gave his last signal, 'England expects every man to do his duty,' and as the telegraphic message was communicated from the Victory, it was greeted with three cheers on board of every ship in the fleet. It was twelve o'clock when this memorable battle began. Nelson's customary signal on going into action, 'Engage the enemy more closely,' was fast belayed at the Victory's mast-head. The British force consisted of twenty-seven sail of the line, four frigates, one schooner, and one cutter; the French and Spaniards united counted thirty-three sail of the line, five frigates, and two brigs. The largest ships on our side were the Victory, the Royal Sovereign, and the Britannia: they mounted 100 guns each. The largest ships on the opposite side were the Principe de Asturias, the Santissima Trinidada of 130 guns, the Santa Anna of 112 guns, and the Rayo of 100 guns. The English had four 98 gun ships and one 80 gun ship. The enemy had six 80 gun ships. Leaving out of the account the frigates and small craft on both sides, Nelson had 2148 guns to oppose to Villeneuve's 2628: his ships were inferior in quality: his superiority lay in the quality of the crews, the long practised skill and bravery of his officers, and his own enthusiasm with which he had inspired every man and boy in in the fleet. The enemy fought bravely, but by three o'clock ten ships of their line had struck, and Admiral Villeneuve was a prisoner. The victory was completed in another half hour; but Nelson had been mortally wounded by a rifle-ball from the mizen-top of a French ship, and he was breathing his last as his sailors were shouting triumphantly. Two Spanish admirals had surrendered. In all, nineteen ships of the line had struck to Nelson at Trafalgar. He died in the arms of his friend Captain Hardy, after uttering these, his last words, 'Thank God I have done my duty.'

Nelson's crowning victory rescued England from invasion, and left her sovereign of the seas.

Composition.

Write an essay (*a*) describing a Saturday excursion with your pupils, or (*b*) on 'The Advantages of Good Manners.'

The Advantages of Good Manners.

Good manners may be shortly defined as good habits, for well-mannered men and women must have been trained to bear themselves well, when boys and girls, by parents and teachers who taught by example and not by precept only. Every one connected with schools can feel what a pleasant thing it is to visit a school where the children are trained to have respect for their elders and for strangers. On the other hand what a pest it is to be in the neighbourhood of a rough unmannerly group of youngsters who delight in bawling nicknames, in tormenting lower animals, in stone throwing, and other ways of annoyance. Teachers are expected to take every means of training the young to 'habits of punctuality, of good manners, and language, of cleanliness and neatness, and also to impress upon the children the importance of cheerful obedience to duty, of consideration and respect for others, and of honour and truthfulness in word and act.' A better summary of what constitutes good manners could scarcely be found.

It is a good policy for young people to cultivate good manners, seeing that many a situation is obtained more through the appearance and demeanour of lads than from the great abilities upon which they may have too confidently prided themselves.

'Worth makes the man and want of it the fellow.'

School Management.

Explain the methods you would follow and the illustrations you would use in introducing a class to the study of Fractions.

THE STUDY OF FRACTIONS.

Having drawn a line on the blackboard, I should divide it into two equal parts; then, after explanation and questioning on what has been done, get the children to see that the two together are equal to the whole.

I should continue by dividing other things, such as apples or oranges, pieces of paper or string, and tell them that the two parts are called *halves*, each of them a *half*, and that two halves make a whole.

The next step in the process would be the division of the line into three equal parts, questioning the pupils in the same manner as before, and getting them to see that three-thirds make up the whole. I should go on with fourths, fifths, &c., till they have a true idea of the different parts, as two-thirds, three-fifths, &c., and how many halves, thirds, fourths, &c., in a whole.

Now might be introduced the expression for a fraction, and referring to the previous way of writing one-half, one-third, &c., I should show that $\frac{1}{2}$ means one something divided into two, $\frac{1}{3}$, one divided into three, $\frac{1}{4}$, one divided into four equal parts. I should now explain that the figure below the line shows into how many parts the object or the line was divided, and the figure above how many of these parts were taken.

We have now reached the stage at which the definition may be given; namely, that 'a fraction (broken part) is a part of a whole,' and then the names of the various fractions given above might be repeated.

By this time they will begin to know that if $\frac{1}{4}$ be taken from a whole, $\frac{3}{4}$ will be left; if $\frac{2}{3}$ be taken from anything, $\frac{1}{3}$ will be left, &c.

Latin.

FOURTH STAGE.

(*The answers to be written on a separate paper.*)

1. Translate into English:—

(*a.*) Hic—tibi *fabor* enim, quando haec te cura remordet,
Longius et volvens fatorum arcana movebo—
Bellum ingens geret Italia, populosque feroces
Contundet; moresque *viris* et moenia ponet,
Tertia dum Latio regnantem viderit aestas,
Ternaque *transierint* Rutulis hiberna subactis.
At puer Ascanius, cui nunc cognomen *Iulo*
Additur,—Ilus erat, dum res stetit Ilia regno,—
Triginta magnos *volvendis* mensibus orbes
Imperio explebit.

(*b.*) Treviri vero atque Indutiomarus totius hiemis nullum tempus intermiserunt, quin trans Rhenum legatos mitterent, civitates sollicitarent, pecunias pollicerentur, magna parte exercitus nostri interfecta multo minorem superesse dicerent partem. Neque tamen ulli civitati Germanorum persuaderi potuit, ut Rhenum transiret.

2. Parse and explain the construction of the words in italics.

Translation.

(*a*) (Know then that) he—for I will speak to thee, since this is the care that torments thee, and I shall unfold the secrets of the fates, by further revelation—he shall wage a mighty war in Italy, and crush the warlike tribes, and impose laws on the nations, and build walls, until the third summer sees him ruling in Latium and the third winter is passed since the conquest of the Ritulians. But the boy Ascanius, now surnamed Iulus,—Ilus was his name so long as Ilia stood in regal power—shall complete a reign of thirty full years, in the cycle of months.

(*b*) On the other hand the Treviri and Indutiomarus allowed no time during the whole winter to pass without sending ambassadors across the Rhine, importuning the citizens, promising sums of money, and declaring that since a great portion of our army was slain a much smaller portion survived. It was impossible, however, to persuade any German state to cross the Rhine.

Parsing.

Fabor—1st person, sing., future, indic. of the defect. verb *fari*, 'to speak.'

Viris—dat., plur., mas., noun, 2nd decl. *vir*, *-viri*, gov. by 'ponet' under the rule 'That verbs of comparing, giving, &c., gov. acc. and dative.'

Transierint—3rd pers., pl., fut., perf., indic. (because it shall be done after something else shall have taken place), verb of 4th conj., *transeo*, *-ii* or *-ivi*, *-itum*, *-ire*.

Iulo—dat., sing., mas., prop. noun, 2nd dec *Iulus*, *-i*. The dat. is put the same as 'cui' by attraction.

Volvendis—abl., pl., agr. with 'mensibus,' mas., gerundive, verb, 3rd conj., *volvo*, *volvi*, *volutum*, *volvere*.

3. Explain and illustrate by examples the use of the Latin Supines.

The supine in *um* denotes a purpose and is used only after verbs of motion, as *eo cubitum*, I go to lie down; *venerunt pacem petitum*, they came to sue for peace.

The supine in *u*, properly an ablative of manner, is used only after such adjectives as *facilis*, *difficilis*, *credibilis*, *incredibilis*, *mirabilis*, *jucundus*, *honestus*, *fas*, and *nefas*, as:—*facile dictu*, easy to say; *jucundum auditu*, pleasant to hear; *nefas est dictu*, it is sinful to say.

4. Translate into Latin:—

While these things are being done by Cæsar, the Nervii, having collected great forces of infantry and cavalry, were preparing to attack Labienus, who, with one legion, was wintering in their territories; and now they were not distant more than a journey of two days, when they learn of the arrival of two legions sent by Cæsar. Accordingly, having pitched their camp, they determined to wait the arrival of the Germans.

Dum haec a Cæsare haec geruntur, Nervii magnis coactis peditatus equitatusque copiis Labienum cum una legione quae in eorum finibus hiemabat, adoriri parabant, jamque ab eo non longius bidui via aberant quum duas venisse legiones missu Caesaris cognoscunt. Itaque positis castris Germanorum adventum exspectare constituunt.

END OF FIRST YEAR.

Music.

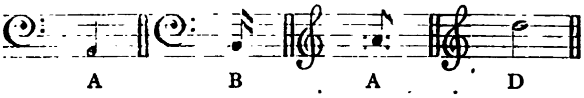
STAFF NOTATION.

(*A Quarter of an Hour allowed for this Paper.*)

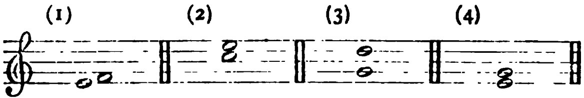
[N.B.—Pupil Teachers may answer questions in either the Staff Notation or the Tonic Sol-fa, but not both.]

1. Write above each of the following its value-name (crotchet, &c.), and below each its pitch-name (C, D, E, or *Do*, *Re*, &c.):—

(1) Crotchet. (2) Semiquaver. (3) Quaver. (4) Minim.

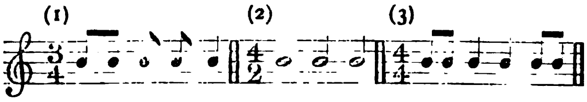


2. Write below each of the following intervals its name (major third, &c.):—



Minor Second. Major Third. Perfect Fifth. Minor Third.

3. Add proper time-signatures to each of the following bars:—



TONIC SOL-FA NOTATION.

1. What measures are shown by the following pulse signs?

(1) | : | : | : | : ||

(2) : | : : | : : | : }

(3) : | : | : | }

(1) Four-pulse. (2) Three-pulse. (3) Two-pulse.

2. Write the names of the following intervals :—(1) *me* to *fah*, (2) *soh* to *te*, (3) *fah* to *doh'*, (4) *lah*, to *doh*.

(1) Minor second, (2) major third, (3) perfect fifth, (4) minor third.

3. Write the following an octave higher, doubling the value of each note :—

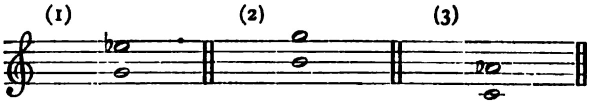
|m :— |— :d |s, :— |

|m' :— |— :— |— :— |d' :— |s :— |— :— ||

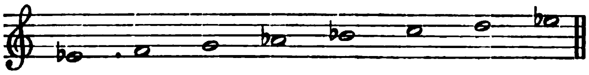
END OF SECOND YEAR.

STAFF NOTATION.

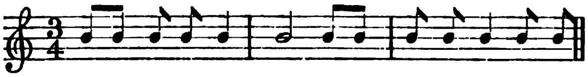
1. Add a minor sixth above each of the following notes :—



2. Write the scale of E♭, placing the necessary flats before the notes to be flattened.



3. Add bars to the following, in accordance with the time signature :—



TONIC SOL-FA NOTATION.

1. Which tones of the common major scale have minor seconds above them?

Me and *te*.

2. What is the mental effect of (1) *lah*, of (2) *te*, of (3) *soh*?

(1) Sad or weeping, (2) piercing or sensitive, (3) grand or bright.

3. What measures are shown by the following pulse-signs?

(1) | : : | : : | : : | : : }

(2) | : | : | : | : ||

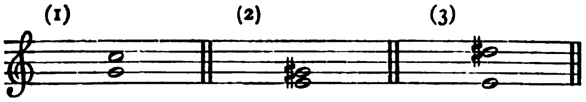
(3) | : : | : : | : : | : : | : : | : : }

(1) Six-pulse. (2) Four-pulse. (3) Nine-pulse.

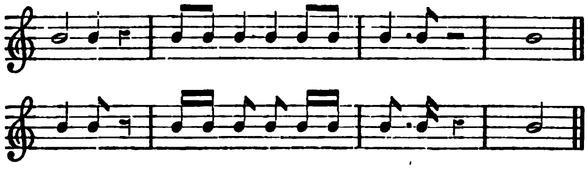
END OF THIRD YEAR.

STAFF NOTATION.

1. Write above (1) a perfect or major fourth, above (2) a major third, above (3) a major seventh :—



2. Re-write the following, halving the value of every note and rest :—



3. State (briefly) the meanings of the following terms :—(1) Crescendo, (2) Ad libitum, (3) Forte, (4) Allegro.

(1) Increasing (in loudness), (2) according to taste, (3) loud (4) cheerful.

TONIC SOL-FA NOTATION.

1. Write the minor sixth above each of the following notes :—(1) above *fah*, (2) above *lah*, (3) above *ray*.

(1) *Ra*', (2) *fah*' (3) *ta*.

2. Re-write the following, doubling the value of each note and rest :—

|s .,l :s . | :d' |— .s :m . ||

|s :—.l |s : | : |d' :— |— :s |m :— ||

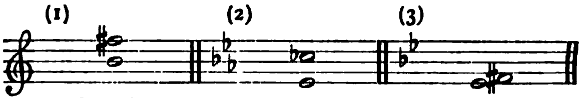
3. State (briefly) the meanings of the following terms :—(1) Crescendo, (2) Ad libitum, (3) Forte, (4) Allegro.

(1) Increasing in loudness, (2) according to taste, (3) loud, (4) cheerful.

END OF FOURTH YEAR.

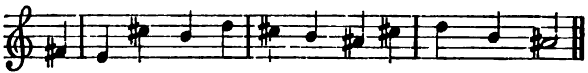
STAFF NOTATION.

1. Write below each of the following intervals its name (major second, &c.) :—



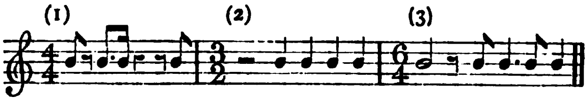
Perfect fifth. Minor Sixth. Augmented Second.

2. In what minor key is the following passage?



B Minor.

3. Complete each of the following bars by adding one note at the end :—



TONIC SOL-FA NOTATION.

1. Write the names of the following intervals :—(1) *te* to *fe*', (2) *lah*, to *fe*, (3) *fah* to *se*.

(1) Perfect fifth, (2) major sixth, (3) augmented second.

2. In the minor or *Lah* mode, (1) what is the major or essential seventh, and (2) what is the minor or essential sixth?

(1) *Se*, (2) *fah*.

3. Write (in figures) over each note and rest of the following passage its value in pulses or fractions of a pulse :—

| .s :d' .,s :m |s .–.f :m .r :d . ||

½ ½ ¾ ¼ 1 ¾ ¼ ½ ½ ½ ½

| .s :d' .,s :m |s .–.f :m .r :d . ||

Our Certificate Class.

BY DR. GEORGE BEACH.

Head Master of Christ Church School, Macclesfield.

DICTATION.

The passage to be written will consist of about 150 words from some standard author, will not present any extraordinary difficulties, and will be dictated by the examiner in phrases, about four or five words at a time.

Generally, it is given out but once, but some examiners, if the room be large, are considerate enough to dictate it from one end of the room, whilst an official at the other end immediately repeats each phrase.

As 'plenty of room for the passage is allowed, words must not be divided between two lines. Any omissions or erasures will be counted as mistakes.' Be careful to write well, and punctuate rationally.

PARAPHRASING.

Very great importance seems to be attached by the Department to this exercise, as from 1882 to 1886 it occupied the field to the absolute exclusion of Grammar and Analysis, both in the Male and Female papers.

For the last six years the ladies have been required to paraphrase one out of two given passages; but to the sterner sex a choice, and that more restricted, has been allowed only in 1882, 1886 and 1887.

About forty minutes should be spent on this test.

The general result of paraphrasing is disappointing and necessarily so. Although 'mine own it is a poor thing.' Given that the selected passage is choice English, written by a standard author, perhaps in poetic diction—how can an ordinary mortal, condemned to express another's ideas, fettered to commonplace prose, and with a conventional vocabulary (the author having selfishly chosen the best expressions) be satisfied with his flat and feeble imitation?

The 'great one' has appropriated the highest seat: the humble copyist must needs occupy a lower one.

The test is a cruel one, Shakespere versus Mary Jones, or Milton versus John Smith; neither do we think that these illustrious poets took any thought for the embarrassing woes of a paraphrasing posterity.

Yet we venture to think the exercise a most valuable one. Although nothing in education can fully supply the lack of a second language, nevertheless paraphrasing is not a bad substitute for translation, especially if it be combined with grammatical analysis.

Every translator is compelled to analyse and paraphrase, and this latter and efficient means of educational development is simply utilised, by a herein wise Department compelling translation of English into English.

As diverse as men's minds are the different methods employed. I. There is the rough-and-ready method, which writes down at once the general sense of the extract. II. There is the dogged or prosaic method which consists of paraphrasing word by word, and sentence by sentence, through sheer force of dictionary and synonyms. This *modus operandi* cannot be recommended. It is responsible for converting 'God moves in a mysterious way, His wonders to perform,' into 'The Lord goes about in a stealthy manner doing astonishing things.' III. There is the cunning method (child of the prosaic), which taking a view of the whole passage, by inverting sentences, substituting the active for the passive voice, &c., using the general for the particular, the concrete for the abstract, craftily, if mechanically, disguises how little has been really effected. IV. Best of all is the artistic method, which is as difficult of description as of employment, and which actually demands a high order of mind for its execution. It consists in appreciating, and reproducing under another guise, the spirit of the excerpt, bringing into the foreground all the essentials in their proper order and prominence, and judiciously subordinating the mere details. It deals with ideas more than words.

Generally, this method is not so successful as 'the cunning one;' nor as a rule is there sufficient time for its employment. In truth, the average examiner will mistake the crafty for the artistic. Nature only brings forth a few Matthew Arnolds.

Therefore, as accessible to all, and yet the most paying, we recommend and give an instance of the third method.

Original passage.	*Paraphrase.*
(*a*) Under the circumstances (*b*) the prosperity (*c*) of the Italian states (*d*) depended (*e*) far more (*f*) on the ability (*g*) of their foreign (*h*) agents, (*i*) than on the conduct (*j*) of those who were entrusted with the (*k*) domestic administration.	(*a*) These facts being so, (*b*) the welfare (*c*) of the Italian communities (*d*) was sustained (*e*) in a much less degree (*i*) by the policy (*j*) of the executive (*k*) at home (*f*) than by the tact (*g*) of their representatives (*h*) abroad.
(*l*) The ambassador (*m*) had to discharge (*n*) functions (*o*) far more delicate (*p*) than transmitting orders of knighthood, (*q*) introducing tourists, (*r*) or presenting (*s*) his brethren (*t*) with the homage (*u*) of his high consideration.	(*l*) Upon these envoys (*m*) devolved (*n*) duties (*o*) requiring much more subtle talent (*p*) than [merely] carrying complimentary distinctions, (*q*) securing social consideration for their compatriots, (*r*) or assuring (*t*) with formal humility (*s*) their fellow diplomates (*u*) of their profound regard.
(*v*) He was an advocate (*w*) to whose management (*x*) the dearests interests (*y*) of his clients (*z*) were entrusted—(1) a spy (2) clothed (3) with an inviolable character.	(*v*) They were [really] confidential agents (*w*) upon whose skill (*x*) the most important concerns (*y*) of their principals (*z*) depended— [mere] (1) emissaries (2) invested (3) with a sacred and privileged immunity.

Note *A* synonyms, *e.g.* (*b*), (*c*), (*g*), (*h*), (*k*), (*l*), (*m*), (*n*), (*o*), (2).

B inversion of sentence at (*f*), (*g*), (*h*), (*l*).

C abandonment of periphrasis, or circumlocution (*j*).

D substitution of plural for singular (*l*), passive for active (*d*), active for passive (*z*), general for typical particulars (*p*), (*q*), (*r*).

E expansion of idea (3), and strengthening words [really], [mere].

F change of figure (*e*), (*v*), (*w*), (*x*), (*y*), (*z*).

See also the examples of paraphrasing in our March issue, and in various numbers of last year's 'Practical Teacher.'

Messrs. W. and R. Chambers publish, price 4d., an excellent little book, 'Rules for Paraphrasing,' by Rev. Canon Morris, late Principal of Carmarthen Training College.

As to which is most difficult of paraphrasing, poetry or prose, opinions differ. 'Much may be said on both sides.' The mechanical difficulty in the former is not so great; for your prose vocabulary is sometimes left comparatively unmonopolised, and it is easy to vary the construction.

On the other hand the result is more 'bathetic,' and the poetical figures and ideas are more difficult of conversion into those admissible in prose.

Analysis of Sentences.—There are in vogue two kinds of analysis, the verbal or extended, and the tabular. Of these we believe the Department rather incline to the latter, for questions have been set as follows:—'Analyse in TABULAR form, showing *A* the nature of the sentence, *B* its relation (if dependent) to its principal sentence, *C* the subject, *D* the enlargement of subject, *E* the predicate, *F* the enlargement of predicate, *G* the object, *H* the enlargement of object.'

Examples of 'Extended or Verbal analysis' will be found in our March issue and in several numbers of 'Practical Teacher' for 1887.

Example of Tabular Analysis.

Sentence.—'When the enemy was defeated, the general who had been mortally wounded commanded that the pursuit should be vigorously prosecuted. Happily his orders were energetically carried out.'

SENTENCE	KIND OF SENTENCE	SUBJECT		PREDICATE		OBJECT		CONNECTIVES
		SIMPLE	ENLARGED	SIMPLE	ENLARGED	SIMPLE	ENLARGED	
A. When the enemy was defeated, the general........ vigorously prosecuted	Principal	general	1 The, 2 who had been mortally wounded	commanded	When the enemy was defeated (time)	(that) the pursuit should be.......... prosecuted		
A 2. who had been mortally wounded	Adjective qual. general	who		had been wounded	mortally (manner)			
A 3. When the enemy was defeated	Adverb mod. commanded	enemy	the	was defeated				when
A 4. that the pursuit should be vigorously prosecuted	Noun sent. gov. by commanded	pursuit	the	should be prosecuted	vigorously (manner)			that
B. Happily his orders were energetically carried out.	Principal	orders	his	were carried out	energetically (manner) happily (accompanying circumstance)			

Cautions and directions.—1. Although the verb 'to be' cannot generally by itself constitute a predicate, it may do so exceptionally, when it means 'to exist' or 'to reside,' etc., *e.g.*, 'God is,' 'Addison was at Rome.'

2. Questions must be analysed as if they were direct statements.

3. Beware of placing adverbial accusatives (objectives) in the object, *e.g.*, 'He lived *a year.*'

4. As nominatives-of-address (vocatives) and Interjections are not articulated parts of a sentence, they should be written across the divisions thus: |Ada|m = Nominativ|e of Add|ress.
|Ala|s! = |Interject|ion|

5. Examine carefully whether the relative adverbs, alias adverbial conjunctions, etc. (viz., 'where,' 'when,' 'while') introduce adjective instead of adverbial sentences, *e.g.*, 'This is the place *where I was born*' (adjective sentence), *e.g.*, 'He died *where I was born*' (adverbial sentence).

6. Note the use of 'as' (see Cæsar) as a quasi-relative, and take heed of the dative case (indirect object).

Not more than twenty minutes should be devoted to this exercise.

Language, style, and allusions.—Under this head a narrow choice (generally four out of five) has generally been allowed to females, and occasionally to males. This portion of the subject must of course be mastered from the manuals in use. All that we can do is to guide the student by our routines, to test in due time his knowledge by papers of questions, to describe the area traversed by the examiners, and to give some technical hints suggested by study and experience.

Cæsar.—(Many of the remarks respecting this play will, with the necessary and easily made corrections, apply also to 'Comus' and the selected essays).

This play has been previously prescribed for the '72, '78, and '83 examinations.

Questions have been asked respecting the life of Shakespere—his place among authors—his two periods of dramatic writings—position of the play among his writings—the source of his information—dates, etc., of the depicted events—plot, allusions and grammatical peculiarities of the play—the finest portions of the play, and how they illustrate Shakespere's genius (set five times)—its household, peculiar and idiomatic phrases—the derivation of its words, and the force of prefixes, and affixes—obsolete words, amplified, narrowed, changed or deteriorated meanings of words—definitions and instances of metaphor, simile, ellipsis, antithesis, metathesis, periphrasis, climax, irony, and pleonasm—the peculiarity of the versification—scanning—tag rhymes and stage directions.

Our examinee will also be required to comment upon given phrases, and to describe, compare or contrast the 'dramatis personæ.' These are important points.

Where possible Shakespere's peculiarities should be illustrated by instances from the Bible, their language being of the same period, *e.g.*, 'his' instead of 'its.'

Comus.—This mask was one of the subjects for the Examinations in '74, '78 and '84. Comus should be compared with Cæsar, as to structure, design, and language. Its moral purport and teaching should be understood—the influence upon it of Milton's scholarship, religious, moral and political opinions noted—its mixture of southern, northern and eastern mythology duly observed. One should also distinguish between what is original, what adapted, and learn to what poets Milton was indebted, and by what poets he has been imitated.

Essays upon Milton and Addison.—An excellent annotated edition of the latter, price 1s., published by Mackie and Co., of Warrington, with Notes, by Rev. M. Stevenson, Principal of Warrington Training College, has been forwarded to us. It is worth procuring in addition to any in the student's possession.

Many of our remarks under 'Cæsar' and 'Comus' will apply, mutatis mutandis, hereto also; and to these, together with the routine hints, we think it unnecessary to add.

ANSWERS TO CORRESPONDENTS.

We shall be pleased to reply briefly, and through this column, to any seeking information or advice.

Answers demanding urgency, will be forwarded per post, on receipt of stamped and addressed envelope.

C. H. (HINCKLEY) and L. R. (SCARBOROUGH).—Male Candidates (Second Year), who have not been examined, or who have failed, or who have not passed satisfactorily in Arithmetic, *must* take Arithmetic *instead of* Mensuration. This change dates from this year.

T. N. (LUTON).—1. See answer above. 2. Our Class is especially intended for Second Year, but we have also included the essential parts of the First Year course.

A.—1. See answer above. 2. You will not require to prepare Cæsar.

REAR-GUARD.—We do not 'coach' by correspondence.

ROUTINE FOR JULY. (MALES.)

DAY	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
MONDAY	In a Mixed School, how would you distribute the various kinds of study and exercise over 25 or 30 hours per week?	Revise Euclid, Book IV.	Paraphrase Lines 201—222 of Cæsar, Act IV. Scene 3	Deductions 162—176 of Egan, Part II.	Paraphrase Comus, Lines 938—957	Political Map of England	Persons, deities, &c., mentioned in Comus	Map of Australia	History — Eighteenth and Nineteenth chapters of McCarthy	School Management — The lessons to be learnt from the different meanings of 'Habit' and 'Character'	Deductions 192—199 of Egan, Part II.	Study the Syntax of Adverbs and Prepositions
TUESDAY	General Geography of Australia	Arithmetic or Mensuration	Outlines of History, to end of Edward IV. reign	Arithmetic or Algebra	History — Sixteenth and Seventeenth chapters of McCarthy	Notes of Lessons on 'The Races of Man'	Study the Syntax of Adverbs and Prepositions	Algebra — Permutations and Combinations	The Wars of Edward III. and Henry V.	First seventeen Propositions of Euclid, Book VI.	Notes and Text of Comus to the end	School Management. — Dislocations, Fractures, Exercise, pp. 243—259 pp. 278—286 (Carpenter's Hygiene)
WEDNESDAY	Algebra — Permutations	To end of page 47 of Jevon's Logic Primer	Deductions 146—161 of Egan, Part II.	Algebra — Combinations	Definitions of Euclid, Books V. and VI.	Write 30 lines of Composition upon the character of Cassius	Deductions 177—191 of Egan, Part II.	Paraphrase last 13 lines of the Essay on Addison	How has climate affected the descendants of English, Dutch and Spanish colonists?	Political Geography of remainder of Australia	Arithmetic or Algebra	History — Twenty-first chapter of McCarthy
THURSDAY	Write 30 lines of Composition upon 'A friend should bear a friend's infirmities'	Write a Large-hand copy of the word 'Insuperable,' and 30 lines of the Small-hand copy 'Revenge is a kind of wild justice'	Definitions of Euclid, Book V.	Political Geography of New South Wales and Victoria	Arithmetic or Algebra	Tables of Yorkist, Lancastrian, and Tudor Dynasties	Arithmetic or Mensuration	History — Nineteenth and Twentieth chapters of McCarthy	Algebra — Permutations and Combinations	Notes of Cæsar to end of Act IV. Scene 3	Arithmetic or Mensuration	Notes of a Lesson on 'Freehand' Drawing
FRIDAY	Notes of Cæsar to end of Act IV. Scene 3	Geography — Winds, and their causes	Arithmetic or Mensuration	Algebra — Combinations	Canon Warburton's Article in our May issue on Pestalozzi	Revise Deductions of Books I. and II.	The flora and fauna of high tropical mountains	First fourteen Propositions of Book VI.	Write 30 lines of Composition contrasting the humour of Addison with that of Swift and Voltaire	The algebraic equivalents of Definitions, Euclid, Book V.	Read the Essay on Addison	Map of Ireland

DAY	FIRST WEEK				SECOND WEEK				THIRD WEEK				FOURTH WEEK			
SATURDAY	Important Dates to end of Henry VI.	Notes of Cæsar to end of Act IV. Scene 3	Algebra — Permutations	Ventilation (To p. 86, Carpenter's Hygiene)	Notes of Comus to line 921	Half-time Registration	First seven Propositions of Book VI.	Arithmetic or Mensuration	Map of Scotland	Arithmetic or Algebra	Outlines of History to end of Henry VIII. reign	Revise Algebra	Arithmetic or Algebra	Important Dates to end of Henry VII.	Revise Algebra	Write out, *for future use*, a Summary of Canon Warburton's last Article on Pestalozzi

<table>
<tr><th>DAY</th><th colspan="12">FIRST WEEK</th><th colspan="12">SECOND WEEK</th><th colspan="12">THIRD WEEK</th><th colspan="12">FOURTH WEEK</th></tr>
<tr><td>MONDAY</td><td colspan="4">In a Mixed School how would you distribute the various kinds of study & exercise over 25 or 30 hours per week?</td><td colspan="4">Analyse, and Parse difficult words of Cæsar, Act IV. Scene 3. Lines 1 to 16</td><td colspan="4">The commerce between the various parts of our Empire</td><td colspan="4">Our Spanish Wars during 18th Century</td><td colspan="4">Revise any Arithmetic</td><td colspan="4">All Geography of Further India and Burmah</td><td colspan="4">What immediate steps should be taken in case of croup, nose-bleeding, dog-bites, scalds, burns and broken bones?</td><td colspan="4">To end of page 47 of Jevon's Logic Primer</td><td colspan="4">Map of Further India and Burmah</td><td colspan="4">Revise any Arithmetic</td><td colspan="4">Geography of South American Possessions</td><td colspan="4">Write 30 lines upon 'Macaulay's position among English writers'</td></tr>
<tr><td>TUESDAY</td><td colspan="4">George III. and his Parliaments. 'The King's Friends.' 'Borough-jobbing'</td><td colspan="4">Exercises in Mental Arithmetic</td><td colspan="4">Paraphrase Lines 201 to 222 of Cæsar, Act IV. Scene 3</td><td colspan="4">Physical Map of Ireland</td><td colspan="4">Describe some investments likely to suit a School-mistress. Stating her income, show how it may be most profitably expended</td><td colspan="4">Needlework — Study pp. 65, 131, 132, 136, 143-145, of Stanley's Needlework Book</td><td colspan="4">Ventilation (To page 86 of Carpenter's Hygiene)</td><td colspan="4">Revise any Arithmetic</td><td colspan="4">Geography of India, Further India or Burmah</td><td colspan="4">Outlines of History from 1760 to 1773</td><td colspan="4">The ordinary and abnormal temperature of the body—How can it be kept or rendered uniform?</td><td colspan="4">Cut out and set on the yoke of a boy's shirt</td></tr>
<tr><td>WEDNESDAY</td><td colspan="4">State the constituents of—Peas, Lean Meat, Bread, Oatmeal, Rice, Cheese and Lard</td><td colspan="4">Notes of Lesson on 'The Races of Man'</td><td colspan="4">Show on sectional paper, representing a square yard, the plan of cutting-out a boy's shirt</td><td colspan="4">Growth of the large towns and development of Industries</td><td colspan="4">Arithmetic — Problems where the difference between Interest and Discount is given</td><td colspan="4">Study the Conjunction, Adjective and Interjection</td><td colspan="4">Prove the statement that 'The sun never sets upon our Empire'</td><td colspan="4">What are the requirements of the 1st Stage of the Specific Subject, 'Domestic Economy?'</td><td colspan="4">Canon Warburton's Article in our May issue on Pestalozzi</td><td colspan="4">What does Macaulay say of Addison's political opinions and life?</td><td colspan="4">Show on sectional paper, representing 36ins. by 18ins., the plan of cutting-out a child's muslin pinafore</td><td colspan="4">Half-Time Registration</td></tr>
<tr><td>THURSDAY</td><td colspan="4">Map of New Zealand</td><td colspan="4">Needlework — Plain</td><td colspan="4">Arithmetic — Any Stocks</td><td colspan="4">School Managmt. — Dislocations, Fractrs., Exercise pp. 249—259, pp. 278—286, (Carpenter's Hygiene)</td><td colspan="4">The impurities of water How can they be discovered and how prevented?</td><td colspan="4">Lives and works of Robertson, Burke, Yonge, Steele and Addison</td><td colspan="4">Analyse, and Parse difficult words of Cæsar, Act IV. Scene 3, lines 18 to 32</td><td colspan="4">Voyages of Anson, Cook and Bligh</td><td colspan="4">Arithmetic — Sharing money in different proportions</td><td colspan="4">What are the strategic possessions of the British Empire?</td><td colspan="4">What mental or physical habits should a School-mistress cultivate or avoid to ward off mental or physical debility?</td><td colspan="4">Arithmetic — To find diameter of circle, circumference being given, or vice versa</td></tr>
<tr><td>FRIDAY</td><td colspan="4">Give list (with cost) of utensils for Cottage Cookery. What sort of stove or range is the best? Why?</td><td colspan="4">Problems similar to Compound Interest, such as 'Pop. increasing 10 per cent. annually'</td><td colspan="4">General History of our West Indian Possessions</td><td colspan="4">Paraphrase Lines 18 to 28 and Lines 65 to 77 of Cæsar Act IV. Scene 3.</td><td colspan="4">Cut out and set on the yoke of woman's night dress</td><td colspan="4">Notes of Lesson on 'Freehand' Drawing</td><td colspan="4">State the facilities affording to 'Saving' or purchasing Annuities, by the Post Office</td><td colspan="4">Write 30 lines of Composition upon 'A friend should bear a friend's infirmities'</td><td colspan="4">Needlework — Plain</td><td colspan="4">School-Management — The lessons to be learnt from the different meanings of 'Habit' and 'Character'</td><td colspan="4">The Quotations, Latin, Greek, or English, in the Essay on Addison</td><td colspan="4">Outlines of History from 1773 to 1783</td></tr>
<tr><td>SATURDAY</td><td colspan="3">Master the 'allusions' in the 2nd half of 'Addison'</td><td colspan="3">History — Place Bill 1742. Pitt's Finance. Growth of National Debt</td><td colspan="3">Physical Features of Further India and Burmah</td><td colspan="3">Write a Large hand copy of the word 'Insuperable' and 30 lines of the Small hand copy 'Revenge is a kind of wild justice'</td><td colspan="3">Net Income from Stock Operations, allowing for Commission and Income Tax, etc.</td><td colspan="3">Notes of Cæsar to end of Act IV. Scene 3</td><td colspan="3">How would you prevent the spread of fevers, small-pox and cholera?</td><td colspan="3">Practise Flannel Patching</td><td colspan="3">Square Root and Compound Proportion</td><td colspan="3">Notes of Cæsar to end of Act IV. Scene 3</td><td colspan="3">Show on sectional paper, representing 54ins. by 36ins. the plan of cutting-out a woman's night-dress</td><td colspan="3">Battles of Quiberon Bay 1759, Cape St. Vincent 1780 and 1797, Rodney's Victory 1782</td><td colspan="3">Study the Conjunction, Adjective and Interjection</td><td colspan="3">Geography of West African Possessions</td><td colspan="3">Explain the method of proving multiplication by 'casting out the nines'</td><td colspan="3">Write out (for future use) a Summary of Canon Warburton's last article on Pestalozzi</td></tr>
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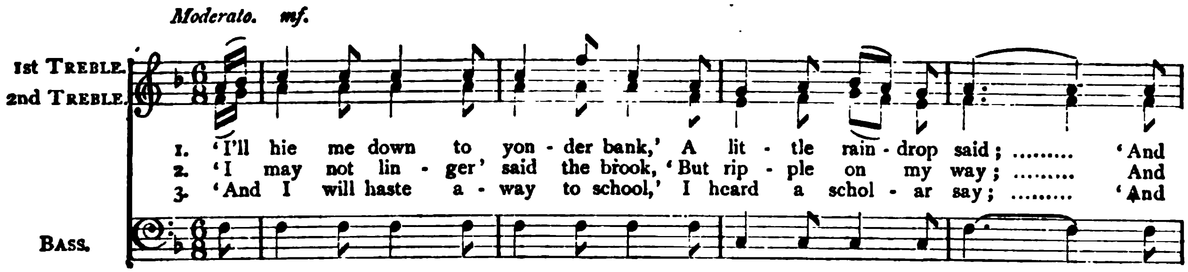
WORK FOR ALL.


Moderato. mf.
1st Treble.
2nd Treble.
Bass.
1. 'I'll hie me down to yon - der bank,' A lit - tle rain - drop said; .... 'And
2. 'I may not lin - ger' said the brook, 'But rip - ple on my way; .... And
3. 'And I will haste a - way to school,' I heard a schol - ar say; .... 'And

KEY F. *Moderato.* *mf.*

```
1st TREBLE. :m .f |s :— :s |s :— :s |s :— :d' |s :— :m |r :— :m |f :m :r |m :— :— |m :— :m
2nd TREBLE. :d .r |m :— :m |m :— :m |m :— :m |m :— :d |t, :— :d |r :d :t, |d :— :— |d :— :d
Bass.       :d    |d :— :d |d :— :d |d :— :d |d :— :d |s, :— :s, |s, :— :s, |d :— :— |d :— :d
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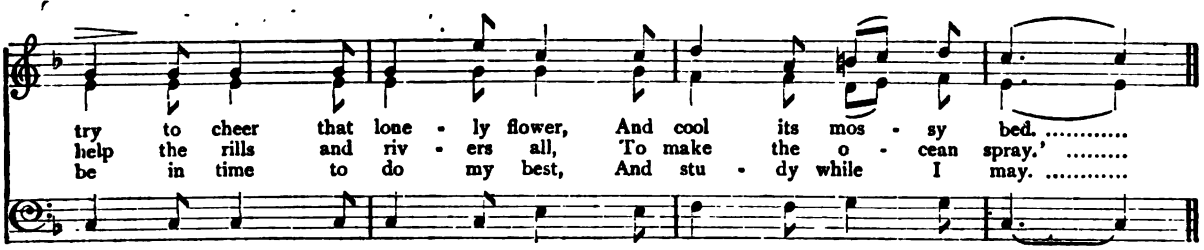
try to cheer that lone - ly flower, And cool its mos - sy bed. ....
help the rills and riv - ers all, To make the o - cean spray.' ....
be in time to do my best, And stu - dy while I may. ....

O.t.

```
r s :— :s |s :— :s |s :— :m' |d' :— :d' |r' :— :l |t :d' :r' |d' :— :— |d' :— ||
t,m :— :m |m :— :m |m :— :s |s :— :s |f :— :f |r :m :f |m :— :— |m :— ||
s.d :— :d |d :— :d |d :— :d |m :— :m |f :— :f |s :— :s |d :— :— |d :— ||
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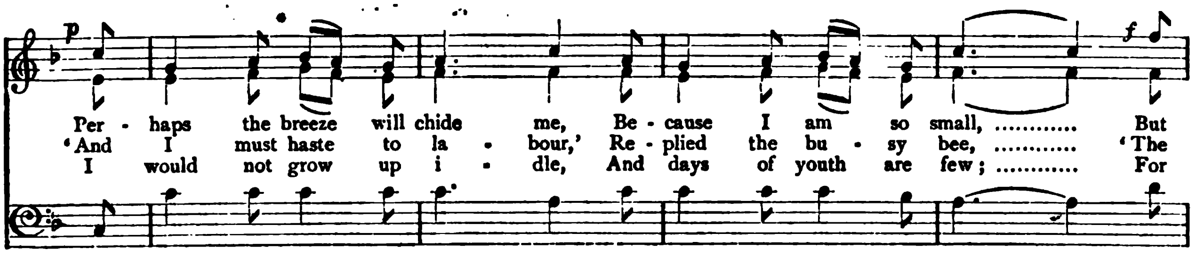
p
f
Per - haps the breeze will chide me, Be - cause I am so small, ... But
'And I must haste to la - bour,' Re - plied the bu - sy bee, ... 'The
I would not grow up i - dle, And days of youth are few; .... For

p f.F. *f*

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d's  |r :— :m |f :m :r |m :— :— |s :— :m |r :— :m |f :m :r |s :— :— |s :— :d'
m t, |t, :— :d |r :d :t, |d :— :— |d :— :d |t, :— :d |r :d :t, |d :— :— |d :— :d
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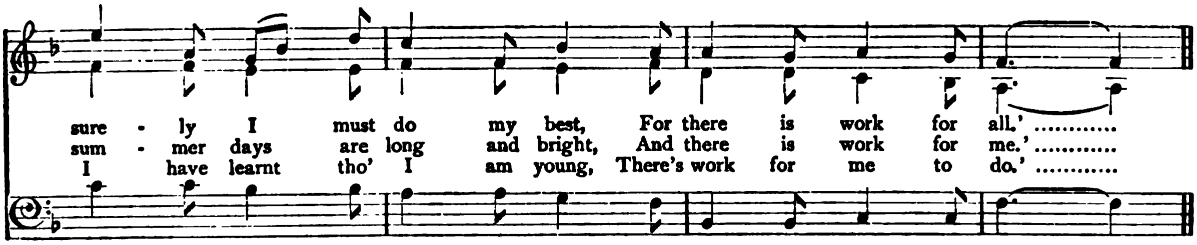
sure - ly I must do my best, For there is work for all.' ....
sum - mer days are long and bright, And there is work for me.' ....
I have learnt tho' I am young, There's work for me to do.' ....

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|t :— :m |r :f :l |s :— :d |f :— :m |m :— :r |m :— :r |d :— :— |d :— ||
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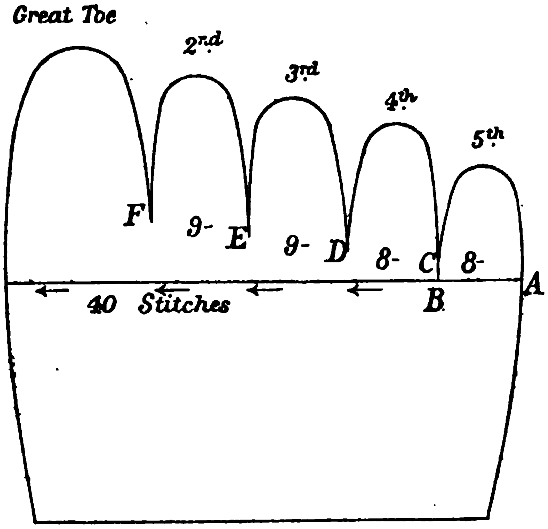
Knitting Maps.

BY MRS. J. D. HARRIS.

STOCKING WITH DIVISION FOR THE FIVE TOES.



The Right Foot of a Gentleman's Sock. 80 *stitches.*

As soon as you have knitted the foot the proper length (as far as to where you usually begin to decrease) divide the stocking in half. 40 stitches on the front pin, 40 on the back.

A. Fifth, or Little Toe.—Take the *first* 8 stitches from the front pin, and on another pin 8 from the back pin opposite. Arrange these 16 stitches on 3 pins, and knit them round for about an inch; but as toes as well as fingers differ in length it will be necessary to measure. Decrease 4 or 5 stitches at the top, break off the wool, and with a rug needle run all the remaining stitches together, exactly like the tip of a glove.

B. Fourth Toe.—Fasten in the wool, and knit all round. When you come to the toe pick up 4 stitches to prevent leaving a hole. (Some people prefer leaving this space open for ventilation, but if you do this you must cast on as many stitches as you would have picked up, or you will not make your toes large enough.) Knit a second row all round.

C. Take 8 stitches from the front pin, and 8 from the back. These, with the 4 picked up, or cast on, must be arranged as before on 3 pins. Knit the length required, and decrease, and finish off as before.

D. Third Toe.—Fasten in the wool and knit 1 round, adding 4 stitches at the opening. Take 9 stitches from the front pin, and 9 from the back. Add the 4, arrange and knit as before.

E. Second Toe.—Take 9 from the front pin, and 9 from the back; add 5 at the opening.

F. The stitches that are left form the great toe. You must add 6 at the opening. Knit the length required, about 1¼ inches, decrease, and fasten off.

The left foot must be exactly reversed. You must begin A. at the *end* of the front pin, instead of the *beginning*.

These stockings, with toes, are said to be a perfect cure for soft corns.

If this is true, suffering humanity will not grudge the extra trouble in knitting this elaborate pattern, which is a decided contrast to the very elementary pattern published last month.

Model Answers to Certificate Questions, Christmas, 1887.

Female Candidates.

FIRST YEAR.

Domestic Economy.

THREE *hours allowed for this Paper.*

Candidates are not permitted to answer more than EIGHT questions.

1. Describe the constituents of milk, and explain why it is called a perfect food.

(1) If we take 100 parts of milk obtained from the cow and submit them to analysis we obtain the following constituents:—

(A) Solids	1. Casein ...	... 4·83	parts
	2. Albumen	... ·58	,,
	3. Fat ...	... 4·30	,,
	4. Sugar ...	... 4·03	,,
	5. Salts ...	... ·55	,,
(B) Water	... ...	... 85·71	,,
		100·00	parts

FOODS are those substances which, after undergoing changes in the digestive organs, serve to renew the organs of the body and to keep them in good working order. Some foods are valuable as formers of *tissue*,—these renew the composition of the organs of the body; others again, through their oxidation, yield warmth and motion; a third class of necessary foods are salt and water, the former entering into the composition of tissue, and both being absolutely necessary to healthy digestion, and to the interchange constantly going on between the various tissues and the blood. A reference to the table above shows that milk contains in itself the entire series of essential foods, and is, in consequence, termed a PERFECT FOOD.

Casein and *albumen* are nitrogenous foods, by which the tissues of the body are constructed and repaired. Their oxidation is also accompanied by the production of heat.

Fat (hydro-carbons) and *Sugar* (amyloids) are seen to exist in milk, and are chiefly valuable as heat and force producers.

Water and *Salt*, which together make up by far the larger portion of milk, assist interchange and digestion.

2. Explain the structure and function of the teeth, and give some rules for their preservation.

(2) (*a*) *Structure of Teeth.*—Teeth are formed of three substances—*dentine*, *cement*, and *enamel*. The dentine is the bone-like substance which forms the inside of the tooth. It is covered in the upper part by a hard enamel; this enamel forms an almost perfect protection to the bony structure within; beneath the exposed part of the tooth the enamel gives place to cement, a substance softer than the dentine, and which in the elephant is termed ivory. The teeth are hollow, the cavity within being supplied with a pulpy substance abundantly supplied with nerves and blood-vessels.

(*b*) *Functions of the Teeth.*—The teeth are the chief agents in masticating the food.

(*c*) *Rules for their Preservation.*—Clean the teeth with finely powdered chalk or charcoal; too much friction with the brush should be avoided. It is best to wash the mouth out at bed-time, and always after a meal, to prevent the mischief which follows from contact with decaying food. Healthy digestion and sound teeth act and re-act upon one another; exercise and pure air are essential to both.

3. How far, and in what way, can a school be helpful in enabling children to mend and preserve their own clothes?

(3) In every elementary school in which girls are instructed it is a condition of earning a grant that the girls be taught plain needlework. A scheme of graduated series of exercises in needlework for each standard is prepared, and inserted in the Code. This scheme includes ability to hem, to knit, to patch, to sew on buttons and make button-holes, and to cut out and put together simple garments for children. The whole of these exercises may be made available for enabling children to mend and preserve their own clothes. Further, the discipline of the school should be such that a desire should be manifested by

each child to maintain a neat appearance. Careful preservation of their own attire, and that of their schoolfellows, should be enforced as a duty, especially as the parents of scholars attending the elementary school are not in circumstances permitting frequent renewal of their children's clothing.

4. What are the different purposes served by food? Name in regard to each of those purposes some one kind of food which is particularly valuable.

(4) Food is required to supply materials for the growth of all the tissues of the body, so that the body may attain full growth, and the waste which daily occurs may be repaired. Food also keeps up the natural heat of the body, and supplies the force necessary for movement and work.

In connection with the first-mentioned purpose of food *meat* may be mentioned. The flesh of animals is one of the main sources of our nitrogenous food, and by this the tissues of the body are mainly constructed and repaired. *Butter* is an example of a non-nitrogenous food, which, by its large per centage proportion of carbon, produces warmth.

5. Explain the nature of the injuries caused by (1) high heels, (2) pointed shoes, (3) tight lacing.

(5) 1. *High-heeled Boots* are injurious, inasmuch as they throw the weight of the body on the front of the foot, and thus the balance of the body is disturbed, so as to throw more strain upon the spinal muscles. Spinal curvature may follow.

2. *Pointed Shoes* leave no room for the movement of the toes during walking, hence these become cramped and deformed; further, the circulation of the blood is impeded, with cold feet and chilblains as a result.

3. *Tight-lacing* exercises an injurious effect upon respiration, the action of the diaphram and the ribs in expanding and contracting the chest being impeded; indigestion also ensues on account of the compression upon the liver and stomach; circulation is obstructed, and this is followed by a blotched appearance of the nose; the figure is deformed at the waist and a tendency to high clavicle structure is induced.

6. How would you remove (1) ink stains, (2) fruit stains, (3) grease stains, and (4) paint from clothing?

(6) 1. *Ink stains* should never be put into soapy or soda water, as they directly become iron-moulds. They should be instantly wetted with cold water, and at once removed by the application of lemon-juice or salt of lemon.

2. *Fruit stains* yield to bleaching powder, especially if after it is put on the powder is moistened by acid, such as vinegar or lemon. Care must be taken not to use an acid upon coloured things.

3. *Grease stains.*—Ox gall is used in the system to dissolve the fats. In the laundry it is used to remove grease from clothing.

4. *Paint.*—Apply turpentine before the paint sets hard.

7. Why is it needful that bed-rooms should be ventilated, and how may this object best be effected?

(7) Impurities are conveyed into the air by the process of breathing and also by the action of the skin. During the day in the ordinary dwelling rooms, doors and windows may be opened and closed at will, but at night the occupants of a bed-room remain for many hours unconscious, and unless means are adopted for the automatic change of air in the bed-rooms, this air may become very injurious. Open windows not only yield draughts, but are objected to on the ground of not being safe.

The ventilation of a bed-room may be effected by means of (1) an open chimney, especially if an opening be made into it near the ceiling. (2) a perforated ventilator over the door communicating with a well ventilated corridor or staircase. (3) A block of wood may be inserted at the bottom of the window-sash, and the window pulled down on this, thus allowing air to be admitted between the two sashes by an upward current. (4) By the use of valves, such as Boyle's and Dr. Arnott's.

8. Give a few simple counsels suited to a pupil teacher on one of these subjects:—

Diet.
Sleep.
Economy of strength.

And add reasons in each case for the advice you give.

(8) DIET.

1. *Necessity of Diet.*—It is found by experience that unless food is regulated in kind and in amount, healthy conditions of body cannot be maintained. Each day brings about a certain amount of waste, which by careful analysis can be determined. It is found, for example, that an adult man loses 4·300 grains of carbon and 200 grains of nitrogen per day on the average; it is, therefore, necessary that the food he eats during the same period should at least contain the above amounts of both carbon and nitrogen.

2. *The Diet must be mixed.*—The requisite amount of nitrogen and carbon is yielded by a diet consisting of ¾lbs of meat and 2 lbs. of bread. If, however, we attempted to live on meat alone 2¾ lbs. would be required before the necessary supply of carbon would be secured; on the other hand, if bread alone be taken, then 3¼ lbs. of bread would be needed, and this would give an excessive amount of carbon.

3. *Diet should vary with changes of Temperature and Work.*—In cold weather a larger amount of fatty substances are required to maintain the temperature of the body; hence more fats should be eaten in winter than in summer. Again, during hard work the losses are almost double those experienced during rest; it follows that an increased supply of food is necessary during periods of great activity.

4. *There should be three meals per day, and each should contain the foods necessary for healthy life.*—An ordinary meal is fully digested in about four hours. If, therefore, we arrange our meals with an interval of five hours between each, the digestive organs obtain regular periods of repose. Where only two meals are taken per day there is danger of overloading the stomach.

5. *Meals should be taken at regular times, and each should be succeeded by a period of rest.*—The reason for this advice is this, that the digestive organs fit themselves by regularly recurring practice to the work they have to perform. If immediately after a meal violent exercise be taken the blood is withdrawn from the digestive organs, and their work is thus impaired.

9. What are arrowroot and Indian corn? What are the special qualities which fit them to be used as food, and how may they best be prepared for use?

(9) *Arrowroot* is obtained from the tubers of a plant called Maranta Arundinacea. It is cultivated in the West Indies, South America, Ceylon, and other tropical countries. It contains 72 per cent. of starch, and whilst it is not highly nutritious it is easily digested. It is thus frequently given to invalids with advantage. It is prepared by mixing an ounce with cold water, and pouring on it a pint-and-a-half of thoroughly boiling milk, stirring it the whole time; the heat used must render the arrowroot and milk into a transparent jelly.

Indian Corn is grown and used to a great extent in America. It is deficient in gluten, but contains a large proportion of fatty matter. Indian corn bread requires the meal to be scalded, and when cool add yeast and salt. After *rising* for about an hour wheat flour is added to about an equal amount; the dough remains for a couple of hours before it is placed in the oven and baked into bread. Indian corn may also be boiled like oatmeal, and be eaten hot with milk or butter. With eggs it forms a nutritious pudding.

10. Explain the use of eggs in cooking. How may they be best preserved for later use?

(10) Eggs are generally beaten or whipped before being used in cooking; in this way air particles are introduced into the egg and by their agency the substance when cooking is rendered light.

To preserve eggs they must be covered so that the fluid material does not evaporate through the shell. Eggs greased all over with lard or plunged into bran will keep longer than when exposed freely to the air. Eggs should be packed with their large end uppermost in order to prevent the yolk approaching and sometimes sticking to the sides of the shell. Another plan adopted for preserving eggs is to mix freshly slaked lime in water to the thickness of cream, and cover the eggs with the mixture.

11. Explain fully how to lay and light (1) an open fire, and (2) a close stove.

(11) 1. *An Open Fire.*—It is first necessary to clean out completely the grate, reserving the cinders for immediate use. When the grate is thus prepared a few pieces of coal or cinder should be loosely placed in the bottom; over these place several pieces

of folded paper, and then arrange over the paper several thin pieces of stick or wood, the upper layer crossing those below so as to allow a ready draught between each; lastly, cover lightly with small selected pieces of coal and the remainder of the cinders. The fire is now ready for lighting.

2. *A Close Stove* requires different treatment. Fresh air cannot enter through the bars in front, as is the case in the open fire, but only through the bottom of the grate. This portion of stove must be left clear in order to induce as much draught as is required; hence do not place a thick layer of coal and cinder in the bottom of a close stove before lighting.

END OF SECOND YEAR.

Female Candidates.

FIRST PAPER.

Domestic Economy.

THREE *hours allowed for this paper.*

No Candidate is allowed to answer more than EIGHT questions.

1. Describe fully the process of making bread.

(1) (*a*) *Materials.*—If a quartern loaf is to be made the following materials will be required:—3½ lbs. of flour, one teaspoonful of salt, 1½ pints of lukewarm water, and 1 oz. of German yeast.

(*b*) *Process of making.*—1. Powder the yeast in a basin, and mix with some of the lukewarm water.

2. Place 2¾ lbs. of flour with salt into the bread-making bowl.

3. Into a hole in the flour pour the yeast and some of the lukewarm water; sprinkle flour over the yeast mixture, and when this begins to crack the whole may be kneaded together. This is done by adding more water, and gradually working the flour into a very thick paste.

4. Cover the bowl with a cloth and place near a fire for two hours.

5. When risen place the ¾ lb. of flour not used on the kneading board, and turn the dough out upon it; knead the dough thoroughly with the dry flour, and when it feels quite elastic place the dough in a well-floured tin.

6. Stand the tin for about 15 minutes in a warm place, prick the top with a fork and place in a hot oven for about two hours, allowing the oven gradually to go down during the last hour.

2. Give recipes for making (1) beef-tea; (2) mutton-broth; and (3) pea-soup.

(2) 1. *Beef-tea.*—Take one pound of gravy beef; cut up very small, taking care to remove skin and fat; then place in a stone jar with half a pint of water; put a lid over the jar. *Stand the jar in a saucepan of boiling water* for three hours; pour the beef-tea into a cup and use salt according to taste.

2. *Mutton-broth.*—Take 3 lbs. of the scragg end of the neck of mutton, 2 oz. of pearl barley, teaspoonful of salt, a turnip, an onion, a carrot, two leeks, and a teaspoonful of chopped parsley. Cut the mutton into small portions and add three quarts of cold water and the salt; simmer for one-and-a-half hours, and skim off all the fat that may rise to the top. Now add the vegetables and the barley and simmer for another half hour; just before serving add the parsley.

3. *Pea-soup.*—Take a quart of split peas, two onions, one turnip, a carrot, a head of celery, a teaspoonful of salt, a half-tea-spoonful of pepper, and some cooked or raw bones. Soak the peas for twelve hours and place in a saucepan with two quarts of cold water. When boiling put in the vegetables, adding bones, salt, and pepper; boil for two hours, stirring occasionally. Take out the bones and pass the soup through a colander. Serve with toast cut into small cubes.

3. Give some simple rules for the management of a School Savings Bank. Should it be permissible to use the bank for the savings of the parents? If not, why not?

(3) *Simple Rules.*—1. The head teacher, who is styled treasurer, should himself receive all monies and sign the bank books.

2. Posting of accounts might with advantage be done by a responsible assistant. This affords a safe check.

3. Encourage especially the children in the Upper Standards to invest. Money transactions are not safe in the hands of very young children.

4. Have a fixed time in each week for the reception and withdrawal of money, and make it so as not seriously to interfere with the playtime of the children.

5. In consequence of interest beginning as soon as the aggregate investment reaches £1, the scholars might receive interest when the saving of each reaches 10s.

It would be inconvenient for the School Savings Bank to be used by the parents, because of the increased labour thrown on the school staff, especially as the Post Office authorities are willing to receive small amounts.

The training in the exercise and habit of thrift in the children would be weakened if their own money was mixed up with that of the parent. As a matter of fact, however, it is found very often that the child's bank fund is drawn upon from time to time for the purchase of clothing and domestic expenses, thus showing that parents do make use of the school for household savings.

4. 'High interest,' it has been said, 'is only another name for bad security.' Explain this, and give examples of some forms of investment for savings, which a prudent person should avoid.

(4) The rate of interest includes not only a return for the use of the capital lent, but also a further sum to indemnify the lender for any risk he may run in making the loan. A perfectly safe investment in England commands from 3 to 4 per cent. interest. Any further interest therefore represents the amount of risk accompanying the investment. When the interest is therefore very high, in most cases it may be taken for granted that the risk is considerable.

Mining (Gold and Diamond) are risky investments. A run of good luck may enhance the value of the shares many times, but they are much more likely to be depressed by failure. A prudent person will prefer a moderate rate of interest with absolute safety to one in which his capital may disappear.

5. An invalid is advised to abstain for a while as far as possible from nitrogenous food. What diet is best suited for such a person, and why?

(5) If meat of any kind is allowed the white meats, such as fish and fowl, only should be eaten. These contain only a small amount of nitrogenous matter. Liebig's extract is low in nitrogenous food, as it neither contains albumen nor gelatine. Although not a perfect food, it is extremely stimulating, and increases the appetite for other foods.

Butter and the fat of meat may be prescribed, and in the form of melted butter and bacon may be added to the white meats enumerated above.

Of all cereals rice contains the least amount of nitrogenous material, and may, therefore, be safely eaten. Arrowroot is not so nutritive as rice; it is, however, more free from nitrogenous matter, is almost pure starch, and is easily digested. Of fresh vegetables carrots contain a high per centage of nitrogenous matter, and the potato a low per centage; hence the latter should be preferred.

6. Name the principal disinfectants, and explain in what way to use them.

(6) The following are the chief disinfectants:—

1. *Heat.*—Clothes are placed in a chamber and submitted to a heat of about 260° Fahr. Bedding may be conveniently treated by steaming. The process of boiling acts as a disinfectant, especially if carbolic acid is added to the water. Sometimes it is advisable to burn all infected articles.

2. *Chloride of Lime* is a common disinfectant. If a little vinegar be added it becomes much more potent. In a sick room it is likely to irritate the lungs of the patient. It is most valuable in purifying empty rooms and water-closets.

3. *Carbolic Acid* is a powerful disinfectant. In the liquid state it is most poisonous, and may be mistaken for porter, which it resembles. Sometimes it is mixed with a powder, as in Calvert's carbolic powder, which contains only from 20 to 30 per cent. carbolic acid.

4. *Condy's Fluid,* or *Permanganate of Potash* is useful in disinfecting linen, but owing to its non-volatile character it has no effect on the atmosphere.

5. *Sanitas* is a favourite disinfectant because of its pleasant odour, and because it is non-poisonous, is volatile, and produces no stain.

7. Suppose the managers of an elementary school intend to establish a cooking class; what sort of room and what apparatus would you advise them to procure? Sketch out the first six lessons of a suitable course.

(7) 1. *Room for Cookery Class.*—The room should be one specially fitted with a firm, long table for demonstration and practice lessons, and containing a flue for carrying off the smoke and the fumes from the stoves. If possible, a class-room should be set apart solely for cookery. It would be convenient if during demonstration lessons the children occupied raised platforms or a gallery.

2. *Apparatus:* (1) *A long table*, firm, with white deal top. If fitted with drawers these would be useful for storing knives and spoons, and would at the same time give stability to the table

(2) *Stoves.*—Gas stoves are most readily fitted, but the fumes soon foul the air, and they are not likely to be used in after life by the children. A small range is far healthier and likely to be of more practical value to the children using it. Gas stoves can be hired at from 2s. to 3s. 6d. per quarter.

(3) *Earthenware and Hardware.*—Stew-pan, various sized saucepans, pudding bowl, and different sized basins, plates, dishes, &c., in all an outfit costing about £6 is required for a class of thirty scholars.

(4) (*a*) Display the apparatus and state the names and uses of the appliances. The oven or gas stove will need most explanation. Make a simple dish such as liver and bacon, or a sausage roll.

(*b*) A demonstration of the above dishes repeated before the class; then allow the class practice in making these for themselves.

(*c*) A demonstration in making a fruit pie, with class practice.

(*d*) A meat pie as above with boiling of potatoes.

(*e*) An Irish stew as above.

(*f*) Rock cakes, marmalade pudding.

8. How would you discover that a child was falling ill with (1) measles; (2) mumps; and (3) scarlatina?

(8) *Measles* commences with a highly feverish attack, the eyes become watery, and there is every appearance of a severe influenza cold. About the fourth day a rash breaks out upon the face and gradually extends downwards in patches over the entire body.

Mumps appear with a high state of fever during the night, and the patient becomes often light-headed. Soon the glands under the lower jaw and ear begin to swell, and for a day or two movement, and even swallowing, is attended with pain.

Scarlatina.—This is another name for a mild attack of scarlet fever. The symptoms are a general feverishness, shivering, and sore throat. The eruption appears earlier than in measles; the spots rapidly run together, and the whole skin assumes a red colour.

9. Why are lime washed walls healthier than those covered with paper, and how is lime washing done?

(9) The wall and ceiling surface of a room should be impervious to moisture, so that the impurities due to breathing and other offensive matter may not soak into it. Paper is the most absorbent coating used for covering the interior of houses, hence it is very unhealthy. Lime-washed walls are far less absorbent and have, further, the advantage of having disinfecting properties to a moderate amount.

In lime-washing obtain first a quantity of unslacked lime, pour into it sufficient water to cover it. The lime will immediately begin to break up, and water must be added to reduce it to the consistency of cream; sometimes, when walls are covered with lime, size is used, in order to prevent the lime rubbing off. In using the lime-wash great care must be taken to keep it the proper thickness. If too thick it will not run smoothly on the wall, and if too thin it will look poor and patchy. Keep the wash the thickness of cream, and then very little splashing need accompany its use.

10. What are the advantages of stewing meat? Say how you would make Irish stew, and give the cost and quantities of the ingredients, supposing that a meal has to be furnished for a father, mother, and three children.

(10) Stewing is a process intermediate between boiling and baking. It possesses the advantage over dry baking that there is no charring nor over-heating of the outside portions; thus, nothing is wasted, and joints too tough or sinewy to be used in any other mode may be stewed with advantage.

Irish Stew.—Take 5 lbs. of potatoes, 1½ lbs. of scrag end of mutton, 1 lb. of onions, and pepper and salt. Cut the meat into small pieces, and put into a saucepan with cold water enough to cover; add half-a-teaspoonful of salt. Let it come to the boil, skim it, and cook gently for an hour. Wash and peel the potatoes, cut them in half, skin the onions and cut them in slices; when the meat has cooked an hour add the vegetables with a sprinkle of pepper and salt, and let all cook slowly with the lid on for another hour. In town the cost would be 1s. 5d.

11. Explain the qualities and uses of (1) borax; (2) soda; (3) ox gall; and (4) chloride of lime.

(11) 1. *Borax* is a substance allied to soda. It is used in the laundry for stiffening linen fronts and collars, and is much preferred to the sole use of starch.

2. The *Soda* bought for domestic use is sodium carbonate. It is an alkaline substance which is soluble in water. It is largely used for cleansing, especially where the water used is hard from the presence of salts of calcium and magnesium.

3. *Ox-gall* is used in the system to dissolve the fats. In the laundry it is used to remove grease from clothing. It is also used in cleaning paintings.

4. *Chloride of Lime*, or bleaching powder, is sometimes used in the laundry. The occasional use for restoring the colour of white clothes may be necessary, but its continued action is injurious to the durability of the fabric. All colours obtained from vegetable dyes and some mineral ones also are destroyed by its application.

——o——

Quarterly Arithmetical Tests.

STANDARD I.—FIRST QUARTER.

1.
7
402
53
6
90

2.
539
412

3.
807
304

4.
9 × 2;
3 × 3;
11 × 4.

SECOND QUARTER.

1.
518
64
9
370
26

2.
153
48

3.
624
570

4.
3 × 10;
4 × 7;
6 × 5.

THIRD QUARTER.

1.
49
608
52
3
871

2.
306
197

3.
814
18

4.
4 × 6;
5 × 12;
6 × 8.

STANDARD II.—FIRST QUARTER.

1. 7,360 + 809 + 52 + 45,096 + 7 + 6,418.
2. From 10,407 take 798.
3. 49,086 × 93.
4. In a porch there were 630 pegs; 487 were occupied by hats, and 59 were broken. How many were empty?

SECOND QUARTER.

1. 67,309 × 508.
2. 42,588 ÷ 6. Write the answer in words.
3. Put down twelve hundred, and subtract 29.
4. 47d.; 63d.; 92d.

THIRD QUARTER.

1. Divide 49,068 by 9, and multiply the quotient by 17.
2. 85,476 × 760.
3. A man takes 3 feet each step; how many steps does he take in walking eight miles, each 5,280 feet?
4. 81d.; 106d.; 134d.

STANDARD III.—FIRST QUARTER.

1. 319,642 ÷ 57.
2. Subtract nine hundred and nine times eight hundred and eighty from a million.
3. Divide eight hundred thousand and eighty by nine hundred and sixty-five.
4. There were 186,200 bricks in a heap. Of these one quarter was removed, and the remainder was carted away in loads of 490. How many loads were there?

SECOND QUARTER.

1. What is the amount of £405 18s. 7½d., £83 0s. 2¾d., £6 14s. 8¼d., 15s. 9½d., 6¼d., and £710 10s. 11d.?
2. How many years are there in five hundred and nine thousand nine hundred and sixty-four weeks, reckoning 52 weeks in a year?
3. From £805 16s. 4¾d. take £795 17s. 8½d.
4. I paid three bills to the amount of £19 8s. 6d. One was £6 10s. 7½d., another £5 19s. What was the amount of the third bill?

THIRD QUARTER.

1. Take seventeen pounds and ten pence farthing from seventy-six guineas.
2. What is the sum of seven thousand and eighteen pounds thirteen shillings and five pence three farthings, one hundred and three pounds eight shillings and nine pence, sixteen thousand five hundred and nine pounds eleven shillings and ten pence halfpenny, three hundred and seventeen pounds six shillings and three pence, fifty pounds nineteen shillings and seven pence farthing, and eighty thousand and six pounds fifteen shillings and eleven pence three farthings?
3. How many books of 476 leaves each can be made from 391 packets of paper, each containing 812 leaves?
4. Thirty books and twenty slates cost one hundred shillings. If each slate cost sixpence, what was the price of each book?

STANDARD IV.—FIRST QUARTER.

1. £73 15s. 10¼d. × 607.
2. Find the ninth part of six thousand three hundred and sixty-two pounds one shilling and three farthings.
3. £19,047 18s. 9½d. ÷ 378.
4. A shopkeeper bought 840 eggs at 8d. per dozen, and sold them at 15 for a shilling. What did he gain or lose?

SECOND QUARTER.

1. Reduce 6,905 guineas 13s. 11½d. to farthings.
2. A grocer bought a chest of tea containing 1¾ cwt. How many quarter-ounce packets could he get out of the chest?
3. Bring one quarter of a million seconds to days.
4. How many yards of calico at 7½d. per yard can I get in exchange for 20 yards of silk at 2s. 9d. per yard?

THIRD QUARTER.

1. Twenty columns of advertisements in a newspaper contain 140 lines in each column, and nine words in each line. What would be the amount for advertisements at the rate of a dozen words for 4d.?
2. Find the value of two fields measuring 2 a. 1 r. 16 p. and 5 a. 3 r. 20 p. at 2s. per square yard.
3. Reduce the earth's circumference (24,890 miles) to inches.
4. If a man earn two guineas a week, and spend 4s. 9d. a day, reckoning seven days per week, how long will it take him to save £8 15s.?

STANDARD V.—FIRST QUARTER.

1. How much change would be received out of a thousand pounds after paying for 489 articles at £1 18s. 10¾d. each?
2. Find the cost of 5 furlongs 181 yards at £18 6s. 8d. per mile.
3. A bankrupt owes £4,716 10s. and pays 9s. 8½d. in the pound; what is the value of his assets?
4. A brewer had 18 qrs. 7 bus. 2 pks. of malt. He sold half at £4 18s. per qr. and the other half at £4 10s. per qr. Find what he received.

SECOND QUARTER.

1. If 15 men mow 12 acres in one day, how many acres would 25 men mow in 2 days?
2. Make a bill for:—30 lambs at £1 15s. each; 150 eggs at 7d. per dozen; 9 horses at 26 guineas each; 58 ducks at 4s. 9d. a couple.
3. If 6 oxen are worth 30 sheep, and 90 sheep are worth £225, find the value of 14 oxen.
4. From a piece of cloth 100 yards long, 27 yds. 3 qrs. were sold for £14 11s. 4½d.; what would the remainder be sold for at the same rate?

THIRD QUARTER.

1. What must be added to the sum of $\frac{3}{8}$ and $\frac{2}{5}$ to make $\frac{9}{10}$?
2. If $\frac{1}{4}$ of a hayrick cost £28 7s. 6d., what would $\frac{1}{6}$ of it cost?
3. A butcher bought a sheep for £2 10s., and sold it at 8½d. per lb. He lost 6s. 8d. What did the sheep weigh?
4. A man spent $\frac{1}{10}$ of his wages in rent, $\frac{1}{6}$ in clothing, and $\frac{1}{3}$ in food. What fraction of his wages had he left?

STANDARD VI.—FIRST QUARTER.

1. Divide ($\frac{5}{7}$ of $3\frac{1}{8} - \frac{9}{14}$) by ($2\frac{4}{9} - \frac{5}{6}$).
2. Add together 609, 6·09, ·0609, and ·00609, and divide the sum by 60·9.
3. Simplify:—$\dfrac{3\frac{3}{4} - (\frac{5}{6} \times \frac{2}{9})}{2 \div (\frac{2}{7} - \frac{1}{8})}$.
4. Multiply 4·079 by $\cdot\dot{3}$ without reducing both decimals to vulgar fractions.

SECOND QUARTER.

1. Reduce $1\frac{2}{7}$ of $\frac{4}{9}$ of $\frac{5}{6}$ of 1s. 9d. to the decimal of 4s. 2d.
2. If $\cdot\dot{1}\dot{8}$ of a yard of wire weigh $\cdot1\dot{6}$ lb., what will be the weight of $\frac{3}{4}$ mile of similar wire?

3. In a town of 16,000 electors, ·38 voted for one candidate, ·23 for another, and ·194 for a third; how many did not vote at all?

4. What decimal of £10 is the sum of £3·45, 17·875s., and 10·25d.?

Third Quarter.

1. What is the amount of £406 10s. invested for four months at 3 per cent.?

2. How many yards of carpet ¾ yard wide will cover a room 20 ft. 3 in. long and 17 ft. 8 in. broad?

3. If I borrow £310 from a bank, and pay the money at the end of 219 days, what interest will be due at 3½ per cent. per annum?

4. What sum will amount to £91 9s. in six years at 4 per cent.?

Standard VII.—First Quarter.

1. If 18 men do a piece of work in 15 days working 8 hours a day, how many hours a day must 20 men work to complete it in 12 days?

2. In what time will the interest on £760 amount to £105 10s. at 4½ per cent.?

3. If £650 gain £26 16s. 3d. as interest in nine months, what principal will gain £26 8s. in eight months?

4. After spending $\cdot 3\dot{7} + \cdot 4\dot{1}$ of my money I had £3 11s. 3d. left; how much had I at first?

Second Quarter.

1. The average amount of four bills is £9 16s. 10d.; one bill amounts to £11 13s. 8d., another to £7 15s. 9½d., and another to £8 10s. 6d.; find the amount of the fourth bill.

2. At what rate per cent. will the interest on £267 10s. amount in 3¼ years to £30 8s. 6¾d.?

3. A can reap 3 acres in 5 days, and B can reap 5 acres in 7 days; in what time can A and B together reap 23 acres?

4. I buy half ton of sugar, and sell 40 per cent. of it at 2½d. per lb., and the remainder at 2d. per lb. Find the average price per lb.

Third Quarter.

1. The education rate in a town is 3½d. in the £. Find the rate per cent., and give the answer in a decimal form.

2. What was the prime cost of an article which was sold for 15s. 5d. at a loss of 7½ per cent.?

3. A sold a horse to B at a profit of 10 per cent., and B sold it to C for £42 7s., also making 10 per cent. profit. What did A give for it?

4. The working expenses of a railway company amount to 55 per cent. of the receipts, and the total receipts in one year amount to £600,000; what dividend can be paid on the capital of 6¾ million pounds?

ANSWERS.

Standard I.

	First.	Second.	Third.
1.	558.	987.	1,583.
2.	127.	105.	109.
3.	503.	54.	793.
4.	18; 9; 44.	30; 28; 30.	24; 60; 48.

Standard II.

	First.	Second.
1.	59,742.	34,192,972.
2.	9,609.	7,098.
3.	5,494,998.	1,171.
4.	84 pegs.	3s. 11d.; 5s. 3d.; 7s. 8d.

Third.

1. 92,684.
2. 64,961,760.
3. 14,080 steps.
4. 6s. 9d.; 8s. 10d.; 11s. 2d.

Standard III.

	First.	Second.	Third.
1.	5,607 + 43.	£1,207 0s. 9½d.	£62 15s. 1¾d.
2.	200,080.	9,807 years.	£104,006 15s. 11¼d.
3.	829 + 95.	£9 18s. 8¼d.	667 books.
4.	285 loads.	£6 18s. 10½d.	3s.

Standard IV.

	First.	Second.
1.	£44,792 3s. 5¾d.	6,960,910 q.
2.	£706 17s. 10¾d.	12,544 qr.-oz.
3.	£50 7s. 9¾d. + 272.	2 days 21 hrs. 26 m. 40 sec.
4.	9s. 4d. gain.	88 yards.

Third.

1. £35.
2. £3,980 18s.
3. 1,577,030,400 in.
4. 20 weeks.

Standard V.—First.

1. £48 19s. 11¼d.
2. £13 6s. 10½d.
3. £2,289 9s. 4¼d.
4. £89 0s. 1½d.

Second.

1. 40 acres.
2. £52 10s. + 7s. 3½d. + £245 14s. + £6 17s. 9d. = £305 9s. 0½d.
3. £175.
4. £37 18s. 7½d.

Third.

1. ⅛.
2. £18 18s. 4d.
3. 80 lbs.
4. ⅔.

Standard VI.

	First.	Second.	Third.
1.	$\frac{801}{812}$.	·2.	£410 11s. 3⅜d.
2.	10·1011.	10 cwt. 90 lbs.	53 yards.
3.	$\frac{55}{102}$.	3,136.	£7 19s. 7⅛d.
4.	1·3596.	·43864583.	£73 15s.

Standard VII.

	First.	Second.	Third.
1.	9 hours.	£11 7s. 4½d.	$1\cdot458\dot{3}$ per cent.
2.	2½ years.	3½ per cent.	16s. 8d.
3.	£720.	17½ days.	£35.
4.	£16 17s. 6d.	2½d.	4 per cent.

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Practical Needlework in Elementary Schools.

BY MISS J. W. WARREN,

Inspectress of Needlework to the Leicester School Board.

When children have passed through the babies' room little with regard to threading needles remains to be taught, but great care is needed to ensure suitable needle and thread. The string and baby threader may now give place to a No. 6 needle, and thread No. 36. The thread should be fresh each lesson, and as good as can be bought, common is apt to untwist, causing children much trouble, and giving rise to irritation. When you have fitted the class proceed with ordinary needle threading drill, No. 4, Sheet II. Continue this for about ten minutes, then repeat, for another ten, the thimble drill in Sheet I. When these can be done quickly and accurately, it is time to begin something a little in advance, and we should then proceed to teach what I call, for lack of a better name, combined thimble and needle drill. See Sheet II., Drill V.

This exercise is to teach the right holding of needle with right use of thimble. No time will be wasted in getting this perfect, as it has been proved beyond dispute that only by a right use of these two implements can a child be taught to become a good needlewoman.

Have your needles threaded, your thimbles ready to put on. A little piece of felt for each child to keep his needle stuck into. Explain by illustration that the first finger and thumb *hold* the needle while the *movement* is effected by the thimble finger. Now direct children to pick up the needle with the left hand, holding it midway between point and eye, point to left, eye to the right. This, done with finger and thumb, can be set right in very little time, and should be repeated until quite uniform throughout the class. Now for the combination, bring the eye of needle in contact with thimble, not quite at the top, but very near, and at the side nearest to the fore finger. (The great effort made to work on the top of thimble is useless, and almost impossible of attainment with young beginners.) Now let the needle be grasped in right hand by finger and thumb just below eye, not losing hold with thimble. We will imagine that the needle is now securely held with both hands as above. There remains to adjust the cotton: this to be raised with left hand, placed over the back of hand between the thimble and next finger, and when all these things are right the position of the arm must receive attention; you will find the elbow out, have it put close in to the side, hand pointing needle to the left, but not directly over shoulder, wrist curved in to body a little; with care in these things you will have taught the Combination Drill V., Sheet II. Note.—Some teachers have this done before the needle is threaded, but this is not so good, I think, for the cotton has to be dealt with in the end, and is rather an aid than a hindrance to the holding, besides helping the teacher to see the needle's eye quite at once, besides, the needle is not lost so easily.

It will be noticed that the five drills explained have had more direct bearing upon the right hand than the left. We must now turn our attention to the work to be done, rather than the instruments of work. In other words, we will analyse the holding of material in the left hand.

Provide strips of unbleached calico about twopence or threepence a yard. Let the strips be cut selvage way nine inches long, two broad, have a hem neatly fixed about one third of inch wide. As these strips will serve for several lessons, care should be taken to both cut and fix very exactly, and, where possible, good brown holland might be used instead of calico, it is firmer and will bear more handling; let each child have one piece placed in front of him, upon desk or lap, hem at top, and towards the child; now proceed in the following way: with the right finger and thumb pick up strip by right top corner; hold it in front of face about level with the eyes just below where held grasp with left hand, first finger and thumb, then place the inch above this over nail of left finger, grasp it with second left finger so that hem is held firmly by thumb and second finger of left hand—the work hangs in the hand. Let elbow be put in to side as in Drill V., and you will have secured Drill VI., Sheet II. This placing of work should be shown by the teacher several times, and at first every child should have it placed for him. No amount of description will do for these manual operations in some cases. We have now gone through all necessary preliminary steps, and are ready for the *stitch*.

I have imagined that these last three exercises will be given to children ranging from four to five years of age, but the *combination* and *work placing* should go on throughout the entire school, preceding each lesson, and in many good girls' departments I observe that the plan obtains of adjusting the positions to suit the several kinds of garments and stitches. With regard to the time to be occupied, this should not exceed half-an-hour at one sitting, this every day during the month or two necessary to initiate them in the whole six, will give ample opportunity for perfection.

In schools where there is no infants' department the teacher should leave out the threader and bead drills, and form two lessons of 3, 4, 5, 6. Great patience is needed if a satisfactory result is to be obtained, and if the children are to get the Code work below Standard I. done during the year; at least two months will be well spent in the preliminary drills before a stitch is taken. Years of experience in different methods compel me to say that bad and indifferent work is due not to a want of energy but to a want of slow deliberate planning well carried out, and results waited for and confidently expected.

Before going on to stitches a word may be said here to those of my readers who find the instruction of boys in needlework distasteful.

Many arguments for and against have found their way into our educational magazines, but the most foolish of all is to suppose that the training is of no use. Surely any and every effort to train the fingers is of some use, whether that of needlework is the best for boys is open to grave doubts, but in the absence of other, and pending the recent grand scheme for technical education, it will be well for teachers to recognise even the little permission granted by the Department as an earnest of better things to come. That boys are less able to profit by the teaching, less capable of neat manipulation, &c., can only be said by those who are quite ignorant of the subject.

Watch-making, requiring the most delicate handling, is in this country almost entirely in the hands of men who in boyhood have served an apprenticeship to the trade. One may venture to say that all manual occupations requiring skill of manipulation are in the hands of men. Given the same teaching, boys will work Schedule III. with as good result as girls; but they seldom get the same teaching, there being a strong tendency to ignore their power as well as their need. A poorer reason for teaching boys is that organization is easier, especially in small schools. It will be understood that the above remarks have reference to infants' schools only.

SHEET II.

NEEDLE THREADING DRILL. No. 4.	COMBINATION DRILL OF THIMBLE AND NEEDLE. No. 5.	WORK PLACING DRILL, LEFT HAND. No. 6.
1. Pick up cotton with the right hand.	1. Put on thimble.	1. Pick up work (right hand) top right hand corner.
2. Point it nicely with left hand.	2. Pick up needle (left hand).	2. Grasp it with left hand finger and thumb, just below where held (on the hem).
3. Pick up needle, left hand.	3. Bring eye of needle to thimble.	3. Put small end over first finger nail of left, with right hand.
4. Put hands together, 3rd and 4th fingers of right on knuckles of left.	4. Grasp needle with right hand a little below the eye.	4. Hold it firmly with second finger and thumb.
5. Move right hand slowly forwards, point of cotton through eye of needle.	5. Take long end cotton in left hand, pass it over right hand between 2nd and 3rd fingers.	5. Hold long end of work with right hand (to be shown so).
6. Grasp needle with right hand and cotton with left.	6. Put right elbow in to the side, point needle to the left, turn wrist a little inwards.	6. Put elbow to side and bend wrist in a little.
NOTE.—This differs a little from Nos. 1 and 2, but this difference is of little moment, again six operations complete the drill though eight might be used—fewer the better for the future work.	NOTE.—The needle is threaded and stuck upon a small piece of felt—No. 6 is a good size—and No. 36 cotton. Needle should not be too short.	NOTE.—No. 5 is to enable the teacher to see the work as No. 6 must be a position order and therefore not a suitable one for examination.

When patterning these drills the right hands should be used, the plan prevalent in some schools of using Teacher's left for right is extremely bewildering and the principle is wrong altogether, if necessary the back should be turned to the class rather than suffer a left hand operation for that used by the right, and a larger specimen should always be used by the teacher for demonstration.

How my School was Examined.

BY A

SCHOOLMASTER IN A COUNTRY TOWN.

On the day appointed and punctually at the time fixed by notice H.M. Inspector and his assistant arrived. The boys were assembled in their proper places, each having on the desk before him everything necessary for the Inspector to proceed at once with the examination, namely, his schedule number on a label, three reading books, examination papers with name, &c., filled in, a pen, blotting-paper, copy and exercise-books to show, and, in Standards V., VI., VII., blank paper for mapping, with all needful drawing material as well as three painted maps which had been drawn by the boys for inspection. These latter were collected, and all wall-maps turned before the examination commenced.

The Inspector inquired for absentees. One only was missing, and he eventually presented himself with the excuse that he had been attending his sister's wedding.

Two pieces selected by the Inspector were sung, and afterwards one chosen by the head-master. After this all boys above Standard II. were mixed in the desks somewhat after this fashion: a Standard III. boy was placed in position, then a IV., then a V., then III., IV., VI., then III., IV., VII., and so on until the back rows of desks down the whole length of the school were filled. The same method was adopted for filling the two front rows of desks. When all were seated cards of Arithmetic were given to the boys of Standard IV., Composition to Standards VI. and VII., Dictation to Standard III., and Standard V., having been called out to a gallery at the end of the room, heard a story read to them by the Assistant Inspector. When this done was cards of Arithmetic were given to all, three sets as a rule being given to each Standard.

The greater part of the Reading and Class-subject work was heard in the class-room by the Chief Inspector, or on the gallery by the Assistant; and the frequent changes consequent thereon were made before the children had finished all their paper work. It happened once or twice that orders were given for a certain standard to go in the class-room without its being stated for what reason; and on arriving there all were ordered back to bring their books or copy-books. All English work was *viva voce;* the whole was taken quietly, and very few of the questions could be heard at a little distance from the children.

Standard I.

The following plan was adopted for examining Standard I. in English. The children were put in front of the desks where Standards III. to VII. were at work, and the Inspector heard the recitation—'Good Night and Good Morning,' and questioned thereon, while the Teachers were calling out the Dictation to Standard III.

For Reading in Standard I. each child had two books, and part of the class read from one and part from the other.

Geography was examined thus:—A plan of the school was drawn on the blackboard, and such questions as the following were asked:—What is drawn on this board? What do you see there? What do these lines stand for? (pointing to lines representing walls; and also to those representing the gallery). Name the four chief points of the compass. Name four others. Point out N., S., E., W., also N.E., S.E., N.W., S.W. How do we find out these points?

For Dictation and Arithmetic the children were placed back to back in one long row in front of the higher classes and the same set of words and sums were dictated to all.

Words.—*Shelf, Sugar, Kittens, Ladies, Sunday, Table, Garden, Fear, Coffee, Cocoa.*

Sums.—1. From 970 take 28.
2. Take 709 from 980.
3. Add 796, 28, 7, 64, 985.

Answers:—(1) 942; (2) 271; (3) 1880.

Tables, oral:—5 × 8, 6 × 9, 5 × 12, 4 × 8, 3 × 9, 6 × 7.

Standard II.

All the children were put back to back in front of the desks where Standards III. to VII. were working on paper, and the Inspector called out the sums while the teachers were calling out the dictation for Standard IV. The written work of this Standard as of Standard I. was done on slates.

Arithmetic.—1. 84,605 ÷ 8.
2. 78,160 × 9.
3. 86,473 × 890.
4. From 19,408 take 4,907.

Answers:—(1) $10{,}575\frac{5}{8}$; (2) 703,440; (3) 76,960,970; (4) 14,501.

Mental Arithmetic,—12 times 12; 11 times 12; 9 × 7; 8 × 9; 12 × 13; 12 × 14; 9 × 12; 9 × 11; 9 × 9; 8 × 12; 12 × 16; 144 pence; 132 pence.

Geography.—What are a river, mountain, sea, lake, peninsula, channel, strait, isthmus, island?
What are the bed, source, and mouth of a river?
What good is a river?
What is a sound?

Reading.—Each boy had two readers, and some read from one and some from the other, the Chief inspector hearing them.

English.—Such questions were asked as, What is a poet?
What is a noun? What is a verb?

Dictation.—A passage from the Geographical Reader: 'Men are fishing in the stream; cattle are drinking of its bright clear waters; boats and barges are passing. At the villages we see bridges or ferry boats to take people over the river. The towns have places for loading and unloading, for making and mending the boats and barges.'

Standard III.

Arithmetic.—*A.* 1. If 1000 marbles were to be divided among 50 boys, but 5 boys were absent and 55 marbles broken, how many would each boy present receive?

2. What must be multiplied by 63 to get the same answer as 1393 by 162?

3. From £20,001 7s. 4½d. take £10,596 19s. 9½d.

4. Add £12 19s. 8½d., £706 15s. 10½d., £7,801 10s. 7½d., £8,107 15s. 0½d., £60,317 18s. 5½d., £777 13s. 11¾d.

B. 1. Divide one hundred and ten thousand and five by one hundred and eighty six.

2. A boy had a bag of marbles out of which he gave 19 boys 7 each. He then had 62 left. How many had he at first?

3. A and B have together £36,000. If A has £9,709 18s. 6½d., how much has one more than the other?

4. Take £79,017 18s. 10¼d. from a quarter of a million pounds.

Answers:—*A.* (1) 21; (2) 3,582; (3) £9,404 7s. 7d.; (4) £77,724 13s. 8¼d.

B. (1) 591 + 79; (2) 195; (3) £16,580 2s. 11d.; (4) £170,982 1s. 1¾d.

Dictation,—Passage from ordinary Reader:—

'I must now pass by the village-school to which the children come from all the straggling cottages and odd farmhouses for miles around, along lanes and through woods, and across old foot-paths, bringing their dinners in little baskets, which they are constantly setting down by the roadside while they gather flowers or hunt for birds' nests in the hedges.'

English.—Sentences had to be formed, and questions answered as; What is a pronoun? A verb? An adjective? All oral.

Geography.—What country do we live in? What is Kent noted for? Name towns on the coast of England. What is a county? What is a country? Name the two northern counties of England. The county town of Devon? Of Westmoreland? Of Sussex? The largest lake of England? Towns in the Scilly Isles? County west of Devon? How far south does the Pennine chain run? What is the highest mountain in Wales? What county is it in? What is the highest mountain of the Pennine chain?

Standard IV

Arithmetic.—Specimen Card:—

1. How many inches are there in 2 miles 6 furlongs 4 poles 3 yards?

2. Divide £9,009 19s. 11½d. by 910.

3. What will 30 dozen bottles of wine cost at 3s. 4d. each?

4. To how many men can I pay their wages out of sixty guineas, if each man gets 31s. 6d.?

Answers:—(1) 175,140 in.; (2) £9 18s. 0¼d. + 48; (3) £60; (4) 40 men.

Mental Arithmetic.—How many lbs. in 1 cwt.? in ½ cwt.? in 1½ cwt.? 3s. 4d. per oz. is how much per lb.? 18s. 6d. is how many times 2d.? How many times 1½d. in 1s.? 90 times 1½d.?

Dictation from the ordinary reader:—

'No one who has not seen them can form an idea of the terrible grandeur of these fires. The clouds of smoke obscure the brightness of a noonday sun and darken the country. They suffocate those whom they overtake with their hot breath; and to see their forked tongues leaping forward as if seeking more food, and to hear their roar as of a hungry monster calling for its prey is to hear and see what will never be forgotten.'

English.—The children recited 'The Fakenham Ghost,' from 'Poetry for the Young.' The following words had to be explained:—dam, foliage, foal, Euston Park, echoed, benighted, hovering, circuits, dappled, patting, frame, nought, sprite, resolution, cheating, gloom, sped, regardless, distinctly, spacious, goblin, conviction.

What birds fly by night? What trees grew there? What frightened her?

The boys were also required to parse a sentence orally from the piece recited without having the book before them. The following sentence was chosen, and each word had to be parsed:—

The little hoofs would rattle round
Upon the cottage floor,
The matron learned to love the sound,
That frightened her before.

Geography.—Name sea between Scotland and Ireland. Between England and Ireland. What country is nearest to Ireland? Nearest points? Towns that trade? When counties were named, their capitals were asked for, and the names of adjacent counties, north, south, east, and west. Ireland was principally touched upon. A few questions were asked on the manufactures. In what province is Kerry? Down? Name mountains in each. What rivers are in the south of Ireland? What river runs into Youghal Harbour? Historical facts were asked with reference to Londonderry, Drogheda, and the Boyne.

Standard V.

Arithmetic.—Specimen Cards:—

A. 1. How much less is $\frac{3}{7}$ than $\frac{5}{6}$?

2. What will it cost for making a road 9 miles 7 fur. 13 pls. at £6 13s. 4d. per mile?

3. A bill: 7 yds. @ 3s. 11d. per yd.; 5½ yds. @ 1s. 7½d. per yd.; 6¼ yds. @ 3s. 6d. per yd.; 24 articles @ 1s. 6d. per dozen; 21¾ yds. @ 1s. 2d. per yd.

4. A man's income is 550 guineas. He spends £1 2s. 4d. a day. What does he save in a year?

B. 1. $\frac{1}{4} + \frac{2}{3} + \frac{7}{9} + \frac{3}{7} + \frac{1}{6}$.

2. A bill: 18½ lbs. @ 5½d. per lb.; 400 @ ¼d.; 30 articles @ 1s. 9d. per doz.; 17 @ 1s. 5¾d.; 90 articles at 4½d. per score.

3. A train uses 15 cwt. 28 lbs. of coal in one day; what will it use in 39 days?

4. A grocer buys 5 cwt. of currants for £7, and sold half of them at 5d. per lb. and half at 4d. per lb. What did he gain?

C. 1. Add $\frac{1}{4}$, $\frac{1}{3}$, $\frac{3}{8}$, $\frac{2}{3}$.

2. If 3 cwt. 2 qrs. 14 lbs. are carried 24 miles for £1 10s., how far should 1 ton 9 cwt. be carried for the same money?

3. A bill: 11 lbs. @ 11d.; 7¼ lbs. @ 10d.; 300 eggs @ 9d. per doz.; 17½ lbs. @ 10d.

4. A man bought 15 sheep for £60. He kept them 17 weeks @ 1s. 3d. per week each, and sold them for £90. What did he gain?

Answers:—*A.* (1) $\frac{17}{42}$. (2) £66 2s. 1d. (3) £1 7s. 5d. + 8s. 11¼d. + £1 1s. 10½d. + 3s. + £1 5s. 4½d. = £4 6s. 7¼d. (4) £169 18s. 4d.

B. (1) $2\frac{73}{262}$. (2) 8s. $5\frac{3}{4}$d. + 8s. 4d. + 4s. $4\frac{1}{2}$d. + £1 5s. $1\frac{3}{4}$d. + 1s. $8\frac{1}{4}$d. = £2 8s. $0\frac{1}{4}$d. (3) 29 tons 14 cwt. 3 qrs. (4) £3 10s.

C. (1) $1\frac{7}{8}$. (2) 3 miles. (3) 10s. 1d. + 6s. $0\frac{1}{2}$d. + 18s. 9d. + 14s. 7d. = £2 9s. $5\frac{1}{2}$d. (4) £14 1s. 3d.

Mental Arithmetic.—How much is $\frac{1}{16}$ of £1? £$\frac{9}{16}$? What fraction is left? How much is £$\frac{7}{16}$?

Composition.—A newspaper extract was read over to be reproduced from memory:

STRANGE CAPTURE OF A HARE.

Mr. Matthews writes of a strange capture of a hare. A neighbour of his was walking in the evening through his field in Pembrokeshire when he heard the cry of a hare. He went towards it, expecting to see the creature caught in a trap. But to his astonishment he saw that a hedgehog had got hold of one of its hind legs. The hare seemed paralysed with fear. It allowed the man to take it up. As soon as the hedgehog was shaken off the hare died, although the injuries it had received seemed but slight.

English.—What do you mean by *Nominative, Transitive, Intransitive, Verb, Predicate?* Analyse (orally) 'Perhaps with this intention you leave him at home.' What is 'at home?' Parse the words underlined: 'The *attendance* of *your affectionate* Roger *is* apt to be not less *troublesome* when you go to make a call. *Perhaps* with this intention you leave him at home.'

The children recited from '*The Lady of the Lake.*' The following words had to be explained:—Heather, bracken, dappled, arraignment, matins, plaids, aught, dwarfish, perchance, hardihood, osiers.

Name the mountains and rivers mentioned in the poetry learnt. What river runs by Stirling? Which is the larger, the Forth or the Teith?

Standards VI. and VII., having learnt the same poetry as V. with additional lines, were asked the same questions.

Geography.—Where is Turkey? Name the islands around. Name those around Greece. What peninsulas are in Europe? Name chief towns of Greece. What is Spain? Name the rivers of Europe. Where do they rise? Through what countries do they pass? Into what seas do they enter? Were you ever on an island? Name it. (Great Britain given by one boy.) Where are the Ionian Islands? To whom do they belong? What are they noted for? What do you mean by Minorca and Majorca?

STANDARD VI.

Arithmetic.—Cards:—

A. 1. Simplify $\frac{2\frac{1}{3}\times3\frac{1}{8}\times5}{7{\cdot}25}$.

2. If $8\frac{4}{7}$ tons cost £9 16s. how many shillings will $\frac{1}{7}$ ton cost?

3. What part of 21 guineas is equal to $\frac{3}{7}$ of 19 fforins?

4. A boy put £7 in a savings bank, interest at the rate of £1 5s. for £50 for a year. He drew it out in 11 months. What sum did he receive?

B. 1. Eggs are sold @ 15·75d. per score; find price of $13{\cdot}\dot{3}$ dozen.

2. What decimal of 2s. 6d. is $\frac{5}{6}\times\frac{3}{8}$ of £$\frac{2}{3}$?

3. How many books $\frac{2}{3}$ of an inch thick can be placed on five shelves, each $1\frac{2}{3}$ yards long?

4. A, B, and C own a ship worth £11,000. A's share is $2\frac{2}{11}$ of C's share. B's share is $\frac{5}{6}$ of A's, and C's share is $\frac{1}{5}$ of the whole. Find the value of each one's share.

C. 1. Find value of ·6 of £$1{\cdot}\dot{6}\div{\cdot}875$ of 2·5.

2. If one share is worth 1s. $6\frac{3}{11}$d., what are 1,342 worth?

3. 2 acres 3 rds. cost £34 17s. 3d. What would half an acre cost?

4. 1,000 lemons were bought at 9d. per doz. 360 were sold @ 10d. per doz., and 450 at 15d. per doz. What must each of the remainder be sold for to gain 14s. 2d. on the whole?

Answers.—*A.* (1) $5\frac{5}{174}$. (2) $3\frac{4}{15}$s. (3) $\frac{38}{1025}$. (4) £7 3s. $2\frac{1}{2}$d.

B. (1) 10s. 6d. (2) $1{\cdot}\dot{6}$. (3) 450 books. (4) A £4,800, B £4,000, C £2,200.

C. (1) 9s. $1\frac{5}{7}$d. (2) £102 3s. 6d. (3) £6 6s. $9\frac{3}{11}$d. (4) $\frac{23}{78}$d.

Composition.—Write a letter about a circus, or about a trade. In the latter, address to a master a form of application for a situation. The former was suggested by the fact that the town was placarded with posters announcing the coming of a circus in the following week.

STANDARD VII.

Arithmetic.—A. 1. If 15 carts making 7 journeys in a day can fetch 1,260 tons in 6 days, how many carts shall I require to fetch 1,000 tons in 2 days, making 10 journeys a day?

2. A merchant went to China for ten years. The first year he made £785; in the next three years he made altogether £1,500; in the next year he made nothing, and in the remaining years he made on an average £345 a year. Find the average annual gain for the ten years.

3. Nine gallons, of which 70 per cent. is pure spirit, are mixed with 6 gallons, of which 85 per cent. is pure spirit. What per cent. of the mixture is pure spirit?

4. If a grocer buys tea at £7 7s. per cwt., and retails it at 1s. 8d. per lb., how much must he sell to clear £153?

B. 1. 55 men do a piece of work 6 furlongs long and 15 yards wide in 14 days. In what time would 30 men do a piece 2 miles long and 10 yards wide?

2. Find average of $17\frac{1}{2}$, $25\frac{3}{4}$, 96, 10, 0, $43\frac{3}{4}$, 19, and 37, and reduce fractional answer to a decimal.

3. A farmer had 240 animals, $29{\cdot}1\dot{6}$ per cent. are cows, $33{\cdot}\dot{3}$ per cent. are sheep, and the remainder horses. Give correct number of each.

4. Reduce 30 yards to the decimal of 1 mile, and $2\frac{1}{2}$ acres to the decimal of 3 square yards.

C. 1. Find the average price per acre of the following:—500 acres at £2 per acre, 472 acres at £1 10s. per acre, 315 at £1 15s. per acre, 290 at £1 12s. per acre.

2. Simplify $5\frac{1}{2}$ of $\frac{4\frac{1}{2}\times6{\cdot}\dot{7}\dot{5}}{{\cdot}7\div3{\cdot}45}-2\frac{1}{2}$.

3. 500 men are in a garrison with orders to hold out 53 days, allowing each man 1 lb. of bread and $\frac{1}{3}$ lb.

of meat daily. After 21 days had passed 290 more men were sent in with orders to hold out 40 days. How much must each have daily?

4. A leap year began on a Sunday. What decimal would the Sundays be of the whole year?

Answers.—*A.* (1) 25 carts. (2) £401. (3) 76 per cent. (4) $77\frac{1}{7}$ cwts.

B. (1) $45\frac{17}{27}$ days. (2) $31\frac{1}{8} = 31{\cdot}125$. (3) 70 cows, 80 sheep, 90 horses. (4) ·017045, and 1033·3.

C. (1) £1 14s. $6\frac{702}{1577}$d. (2) $821\frac{45}{58}$. (3) $\frac{40}{79}$ lbs. bread and $\frac{20}{79}$ lbs. meat. (4) ·1448 + etc.

Composition.—Write all you know about the wild animals of this country, introducing a story if you can.

In the remaining subjects Standards VI. and VII. were examined together.

Grammar. The whole of this part of the examination was oral. The children had their reading books in their hands, and the Inspector read out the following sentences and told the children where to find them.

A. 'They always search their abode for any object they may have lost.'

B. 'Noxious animals *have been replaced* by the *naturalisation* of many of the foreign *fauna which* are either distinguished for their beauty or *valuable* for their flesh.'

C. '*This* transfer *which* adds so much to the richness of the country can be vastly *accelerated*.'

D. 'But we can no longer tarry to speculate further on the riches of this *aviary* which contains rare specimens of birds from all parts of the world.'

The boys were questioned as to the kinds of these sentences, and how their parts are joined; and the words in italics had to be parsed. The prefixes *re*, *dis*, *trans*, and *ac* were taken as subjects for questioning. Words containing prefixes were given, and the meaning and different forms of the prefix asked for.

Mental Arithmetic.—If an orange cost 1d., and was sold for $1\frac{1}{2}$d., what was the gain per cent.?

Geography.—Standards V., VI., VII. had prepared the same geography, namely, Europe; but the two upper Standards were examined apart from V. No maps were allowed to be seen during the examination.

Name the islands of Europe. (The Hebrides and other islands round Great Britain were required.) Name the towns on those islands. What are the chief volcanoes of Europe, and what towns have they destroyed? What is the south of Greece called? What countries are around Turkey? Round Austria? Where do the rivers Rhine and Rhone rise? What were the Greeks noted for? The Romans? What is the capital of Malta and what is it used for? What is the capital of Portugal? What caused the trade of Venice to decline, and what is causing it to rise again? What are the mountains called which stretch down through Italy? What place has suffered from earthquakes? What are the chief naval stations in France? Name the Channel Islands. Where is the island of Elba, and what is it noted for? What is the peninsula called which connects the Morea with the northern part of Greece? What celebrated pass is there in Greece, and what happened there? Name the straits which divide the islands of Corsica and Sardinia. What strait divides the island of Sicily from Italy? Where are the Lipari Isles? Where is the town of Syracuse? What is the cape in the heel of Italy?

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music.

DIVISION II.

Time—continued.

52. The foregoing sections deal with all the time work required at sight by the Code from this Division. It would, however, be unwise for teachers to confine all the exercises and songs to these narrow and monotonous limits. At least the division of a pulse into halves should be properly taught.

53. The first thing to do in teaching half pulse tones is to make the ear perfectly familiar with the effect and to reserve the notation until this is accomplished. Thus for several lessons the teacher should monotone to *laa* such exercises as these:

(*a*) | l :l | l.l:l || (*b*) | l :l.l | l :l ||
(*c*) | l.l:l | l :l || (*d*) | l :l | l :l.l ||

where in four pulses the position of the half-pulse tones is varied, and he should get the class to describe where the half-pulse tones fall and to imitate the pattern.

54. The time name for half-pulses should be introduced very soon after the effect of the division is felt and imitated, and may precede the teaching of notation. The time name for two tones equally dividing a pulse is

TAA TAI (pronounced tah-tay).

This name must be pronounced as one word of two syllables, and must in its pronunciation accurately reproduce the rhythmic effect of what it names. Both syllables must be said in the time of a full pulse TAA. It is not inconsistent to use the syllable TAA for a whole pulse tone, and for the first half only. As will be seen later on the time names (or rhythm names as they might be better called) are names for strokes on a particular *part* of a pulse rather than indications of value.

55. Great familiarity with rhythmic effects can be gained by using the time names freely, and side by side giving numerous ear exercises to be answered in time names. It is an advantage to point from name to name written on the blackboard thus:

TAA
TAA TAI

taking care, of course, that a regular pulse is maintained. In giving ear exercises in time the teacher may sing to *laa* such passages as those given in Section 53, or he may tap them with his pointer. Children take great interest in these exercises.

56. The points to bring out in fixing the notation in the minds of pupils are (1) that there are two notes in one pulse; (2) that the two notes have a dot (.) between them. Teachers should note that this dividing dot should range with the bottom of the sol-fa letters thus, :l . l || not thus :l · l ||

57. Merely telling children that this is the notation of half-pulses will, of course, make very little impression upon their memories. They must be repeatedly called upon to come forward and find the half-pulses in a blackboard or other exercise, or they can be asked to write half-pulse notes in some pulses left empty, one child writing the notes and another the dividing dot. In order to draw great attention to the dot an exercise containing many divided pulses may be fully written on the board, and then the teacher announces that he intends to rub out all the half-pulse dots, and that he wants pupils to come forward and restore them.

58. When exercises comprising all the time so far taught can be monotoned fluently, combined time and tune should be practised. In constructing such exercises it should be noticed that half-pulses are generally easier to sing on weak than upon strong accents: that they can be sung easily on repeated tones and with stepwise movement of any tones, and with most leaps in the doh chord.

Exercises for Half-pulse tones.

(1) |d :d .d |s :s .f |m :m |s :— }
|*m :m .m |m :m .r |d :d |t_1 :d .r }
|d :— |d :— |s_1 :s_1 |s_1 :l_1 .t_1 ||

This can be sung as a three part round, the second part entering when the first reaches * &c.

(2) |d :s .m |d :r .m |f :s .f |m :— }
|m :r .d |t_1 :d |r :d .t_1 |d :— ||

(3) |d .m :s .m |d :r |m :r .d |s :— ||
|l .s :f .m |r :m .f |s .f :m .r |d :— ||

(4) |s .l :s .f |m :s |d .r :m .f |m :— ||
|r :m .f |s .f :m .f |m :r |d :— ||

The above should be (1) sung to time names on a monotone; (2) to *laa* on a monotone; (3) in time and tune combined.

CODE REQUIREMENT.

EAR TEST.

To imitate a simple phrase of not more than four notes, using the syllable laa, after hearing the examiner sing (or play) it twice through.

Example

d m r d ||d' s l s ||s d' t d' ||

59. From the foregoing it will be seen that the ear tests for this Division are *only imitative*, *i.e.*, children are not required to *name* notes, but simply to reproduce short phrases sung or played. The wisdom of this requirement is unquestionable. The chief advantage of mere ear singing—the power it gives of picking up tunes quickly—is pressed into the service of a course of note singing, and the best possible foundation is laid for the more difficult task of telling the names of tones sung as an ear test. The requirement, therefore, is imposed less because of its inherent difficulty than because it indicates the path of preparation for naming.

60. The exercises given should be graded. At first, they should be in slow time, and should be sung two or three times before being repeated by pupils. The phrases easiest to catch are those that include leaps only in the Doh chord and that use the other tones in stepwise succession. Some tests should contain repeated tones.

Examples for imitation.

To be sung by the teacher to *laa* or to the sol-fa syllables, and imitated as sung.

Note.—Vary the key frequently. Use a high key when the s_1 is touched.

Easy.

d d s s		d s m d		d d' s m		s d m	
m r d		s t d'		s l s		s f m		d m s	
d r m		m r m		d r d		d' t d'		d t_1 d	
d s_1 d		d s_1 t_1 d		d s_1 m d		s_1 l_1 t_1 d	

Moderately easy.

s l s m		s f r d		d r f m		s l s d	
m s r d		d t_1 r d		d s t_1 d		s d' s s	
s r m d		d m f s		s f m d		m f r m	

Moderately difficult.

These represent the standard of difficulty required in the examination.

|f r m s ||l s r d ||d' t s d' ||d f r m ||
|l s m r ||t_1 r f m ||s_1 m r m ||r m s d ||

Difficult.

d' t d r		l f d m		d' l f s		f l d m	
d l m t		d t_1 s r		m f t s		l r' s f	
m t d r		d r l_1 f		s d t d'		f t_1 s r	

61. The above can be made into fresh exercises by performing them backwards. It is a good plan for the teacher to sol-fa an exercise and require the class to sing it back to *laa*. Other uses of these exercises will be described later on.

Examples for imitation.

Combined time and tune.

d :r	m.r :d			s :s.l	s.f :m	
d.r :m.f	s :m			m.f :m.r	d :—	
r.m :f	m.r :d			f.m :r.d	t_1 :d	
t_1 :d.r	d :s_1			s_1.l_1 :t_1.d	r :d	

(To be continued.)

———o———

Jeanne d'Arc, by Lamartine.

TRANSLATED BY A. M. BOWER,

Late Master in University College School, London.

IX.

JEANNE D'ARC.	JOAN OF ARC.
Pendant que sa beauté charmait les yeux,	While her beauty charmed all eyes,
le recueillement de sa physionomie,	her contemplative countenance,
la méditation de ses traits,	her thoughtful features,
la solitude et le silence	the solitude and silence
de sa vie étonnaient son père,	of her life astonished her father,
sa mère et ses frères.	her mother and her brothers.
Rien des langueurs de l'adolescence	No youthful languor
ne trahissait en elle son sexe :	betrayed her sex :
elle n'en avait que	she possessed only
les formes et les attraits.	its form and its charms.
Ni la nature ni le cœur	Neither nature nor her heart
ne parlaient en elle.	spoke in her.
Son âme, retirée dans ses yeux,	Her soul, concentrated in her eyes,
semblait plutôt méditer que sentir :	seemed rather to meditate than to feel :
pitoyable et tendre cependant,	compassionate and tender nevertheless,

mais pitoyable et tendre d'une pitié	but compassionate and tender with a pity
et d'une tendresse qui embrassaient	and a tenderness which embraced
quelque chose de plus grand	something grander
et de plus lointain que son horizon.	and more distant than her horizon.
Elle priait sans cesse,	She prayed incessantly,
parlait peu,	spoke very little,
fuyait les compagnies de son âge.	avoided the companions of her own age.
Elle se retirait ordinairement à l'écart,	Usually she withdrew to some spot, apart,
pour travailler à l'aiguille,	to work with her needle,
dans une enceinte close,	to some closed place,
sous une haie derrière la maison,	under a hedge behind the house,
d'où l'on ne voyait que le firmament,	whence she could see only the sky,
la tour de l'église,	the church steeple,
le lointain des montagnes.	the mountains in the distance.
Elle semblait écouter en elle des voix	She seemed to listen to inward voices
que le bruit extérieur	which any outward noise
aurait fait taire.	would have silenced.
Elle avait à peine huit ans,	She was barely eight years old,
que déjà tous ces signes de l'inspiration	when all these signs of inspiration
s'étaient manifestés en elle.	displayed themselves in her.
Elle ressemblait en cela	In this she resembled
aux sibylles antiques,	the ancient Sibyls,
marquées dès l'enfance	stamped from their infancy
d'un sceau fatal de tristesse,	with the fatal seal of sadness,
de beauté et de solitude	beauty and solitude
parmi les filles des hommes :	among the daughters of men ;
instruments d'inspiration	the agents of inspiration
réservés pour les oracles,	reserved for the oracles,
et à qui tout autre emploi	and to whom every other employment
de leur âme était interdit.	of their soul was forbidden.
Elle aimait tout ce qui souffre,	She loved everything which suffers,
les animaux, ces intelligences douées	animals, those creatures endowed
d'amour pour nous et privées	with love for us and deprived
de la parole pour nous le communiquer.	of speech in order to impart it (love) to us.
Elle était, disent ses compagnes,	She was, said her companions,
miséricordieuse et douce pour les oiseaux.	compassionate and gentle to birds.
Elle les considérait comme	She looked upon them as
des créatures condamnées par Dieu	creatures ordained by God
à vivre à côté de l'homme	to live side by side with man
dans les limbes indécises	in the uncertain borderland
entre l'âme et la matière,	between the soul and matter,
et n'ayant de complet encore dans leur être	and having no perfection as yet in their being
que la douloureuse faculté	except the torturing faculty
de souffrir et d'aimer.	of suffering and loving.
Tout ce qui était mélancolique	Everything which was melancholy
et infini dans les bruits de la nature	and infinite in the sounds of nature
l'attirait et l'entraînait.	attracted her and carried her beyond herself.
'Elle se plaisait tellement	'She delighted so much
au son des cloches,	in the sound of bells,
dit le chroniqueur,	said the chronicler,
qu'elle promettait au sonneur	that she promised to the bellringer
des écheveaux de laine	skeins of wool
pour la quête d'automne,	for the autumn collection,
afin qu'il sonnât	in order that he might ring
plus longtemps les *Angelus*.'	a longer peal at the *Angelus*.'
Mais elle s'apitoyait surtout	She was especially moved with pity
sur le royaume de France	for the kingdom of France
et sur son jeune Dauphin,	and for her young Dauphin,
sans mère, sans pays et sans couronne.	without mother, country or crown.
Les récits qu'elle entendait faire	The tales that she heard related
tous les jours par les moines,	every day by monks,
les soldats, les pèlerins et les mendiants,	soldiers, pilgrims and beggars,
ces nouvellistes des chaumières en ces temps-là,	the cottage newsmen of those times,
remplissaient son cœur de compassion	filled her heart with pity
pour ce gentil prince.	for this gentle prince.
Son image s'associait,	His image was associated,
dans l'esprit de la jeune fille,	in the mind of the young girl
aux calamités de sa patrie.	with the woes of her country.
C'était en lui	It was in his person
qu'elle la voyait périr,	that she saw it (France) perishing,
en lui qu'elle priait Dieu	in his person that she prayed God
de la ressusciter.	to raise it up again.
Son esprit était sans cesse	Her mind was for ever
occupé de cette rêverie	busy with these thoughts
et de cette tristesse.	and with this sorrow.
Faut-il s'étonner	Can we wonder
qu'une telle concentration de pensée	that such a concentration of thought
dans une pauvre jeune fille	in a poor young girl
ignorante et simple,	(who was) ignorant and simple,
ait produit enfin	should have at last produced
une véritable transposition de sens	a real transposition of the senses
en elle et qu'elle ait entendu	in her and that she should have heard
à ses oreilles les voix intérieures	in her ears those inner voices
qui parlaient sans cesse à son âme ?	which incessantly spoke to her soul ?
Il y a si près de l'âme	Our soul is so closely allied
aux sens dans notre être,	to our senses in our life,
que, si les sens trompent	that if the senses deceive
et troublent l'esprit	and disturb the mind
par leur exaltation et leur désordre,	by their super-exaltation and disturbance,
l'esprit de son côté trompe	the mind on its side deceives
et trouble facilement les sens.	and easily disturbs the senses.
Ces visions et ces auditions merveilleuses,	These wonderful visions and voices,
bien qu'elles puissent être illusions,	although they may be illusions,
ne sont pas mensonges pour ceux	are no lies for those
qui les éprouvent et qui les racontent.	who experience and relate them.
Merveilles sincères, elles sont phénomènes,	Sincere marvels, they are phenomena,
quoiqu'elles ne soient pas prodiges.	although they are not prodigies.
Il est difficile à l'homme,	It is difficult for a man,
plus encore à la femme,	still more so for a woman,
lorsqu'ils sont préoccupés	when they are absorbed
jusqu'à la passion	with their whole soul

d'une idée ou d'un doute,	in an idea or a doubt,
lorsqu'ils s'interrogent	when they question (examine) themselves
et qu'ils s'écoutent en dedans,	and when they listen to the inward voice,
de distinguer entre leur propre voix	to distinguish between their own (inward) voice
et les voix du ciel,	and the voices from heaven,
et de se dire :	and to say to themselves :
'Ceci est de moi ; ceci est de Dieu.'	'This (voice) comes from myself ; that from God.'
Dans cet état, l'homme se rend	In this state man interprets
à lui-même ses propres oracles,	his own oracles to himself,
et il prend son inspiration pour divinité.	and mistakes his own inspiration for (the voice of the) Divinity.
Les plus sages des mortels	The wisest of mortals
s'y sont trompés	have been thus deceived
comme les plus faibles des femmes.	as well as the weakest of women.
L'histoire est pleine de ces prodiges.	History is full of these prodigies.
L'Égérie de Numa,	Numa's Egeria
le génie familier de Socrate,	the familiar spirit (genius) of Socrates,
n'étaient que l'inspiration écoutée	were nothing but an inspiration (which was) obeyed
à la place des dieux dans leur âme.	instead of the gods in their soul.
Comment une pauvre bergère	How could a poor shepherdess
d'un village hanté par les fées,	in a village frequented by fairies,
nourrie de ces révélations populaires	brought up among popular superstitions
par sa mère et par ses compagnes,	by her mother and companions,
aurait-elle douté de ce que Socrate	(how) could she have disbelieved what Socrates
et Platon consentaient à croire ?	and Plato were satisfied to believe ?
La candeur fut le piège de sa foi ;	Her (very) candour was the snare of her faith (belief) ;
son inspiration eut les vertiges de son âge,	her inspiration partook of the giddiness of her age,
de son sexe, de son époque, de sa crédulité.	her sex, her times, her credulity.
Elle crut à des voix,	She believed in voices,
à des visions, à des prodiges ;	in visions, in prodigies ;
mais l'inspiration elle-même	but inspiration itself
fut la merveille,	was the marvel,
et le patriotisme triomphant	and triumphant faith
atteste du moins en elle	prove at least in her
la divinité du sentiment	the divinity of her feelings
et la vérité du cœur.	and the truthfulness of her soul.

X.

Elle entendit longtemps ces voix	She had heard those voices long
avant d'en parler	before speaking of them
même à sa mère.	even to her mother.
Un éblouissement de ses yeux	A dazzling of the eyes
les lui faisait présager	foreboded them (the voices) to her
par une explosion de douce lumière	by an outburst of gentle light
qu'elle se figurait	which she imagined
découler du ciel.	came down from heaven.
Tantôt ces voix lui recommandaient	Sometimes these voices urged on her
la sagesse, la piété, la virginité ;	wisdom, piety, chastity ;
tantôt elles l'entretenaient	at other times they conversed with her
des plaies de la France	on the wounds of France,
et des gémissements	and the groaning
du pauvre peuple.	of its wretched people.
Un jour, à midi, dans le jardin	One day, at noon, in the garden,
où elle était seule,	where she was alone,
sous l'ombre du mur de l'église,	under the shade of the church-wall,
elle entendit distinctement	she distinctly heard
une voix mâle qui l'appela	the voice of a man who called her
par son nom et qui lui dit :	by her name and said to her :
'Jeanne, lève-toi ;	'Joan, arise ;
va au secours du Dauphin,	go to the aid of the Dauphin,
rends-lui son royaume de France !'	restore to him his kingdom of France !'
L'éblouissement fut si céleste,	The dazzling vision was so heavenly,
la voix si distincte	the voice so distinct
et la sommation si impérative,	and the summons so imperative (commanding),
qu'elle tomba sur ses genoux	that she fell on her knees
et qu'elle répondit en s'excusant :	and replied as she (thus) excused herself :
'Comment le ferais-je,	'How can I do so,
puisque je ne suis qu'une pauvre fille,	since I am only a weak girl,
et que je ne saurais ni chevaucher	and since (*que*) I know neither how to ride
ni conduire des hommes d'armes ?'	nor how to lead (command) armed men ?'
La voix ne se contente pas	The voice was not satisfied
de ses excuses :	with her excuses :
'Tu iras, dit-elle à Jeanne,	'Thou must go, it said to Joan,
trouver le seigneur de Baudricourt,	and find the Lord of Baudricourt,
capitaine pour le roi à Vaucouleurs,	a captain of the king at Vaucouleurs,
et il te fera conduire au Dauphin.	and he will take (conduct) thee to the Dauphin.
Ne crains rien ; sainte Catherine	Fear nothing ; Saint Catherine
et sainte Marguerite viendront t'assister.'	and Saint Marguerite shall come to help thee.'
A cette première vision,	To this her first vision,
qui la fit trembler et pleurer d'angoisse,	which made her tremble and weep with anguish,
mais qu'elle garda encore	but which she still kept
comme un secret entre elle et les anges,	as a secret between her and the angels,
d'autres succédèrent.	other (visions) succeeded.
Elle vit saint Michel	She saw St. Michael
armé de la lance, vêtu de rayons,	armed with a spear, clothed with rays of light,
vainqueur des monstres,	the vanquisher (destroyer) of monsters,
tel qu'il était peint	such as he was painted
sur le tableau de l'autel	on the altar picture
de son hameau.	in her hamlet.
L'archange lui dépeignit	The Archangel described to her
les déchirements et	the intestine commotions and
les asservissements du royaume.	the enslaving of the kingdom.
Il lui demanda	He exacted from her
compassion pour son pays.	compassion for her poor country.
Sainte Marguerite et sainte Catherine,	St. Marguerite and St. Catherine,
figures divines et populaires dans ces contrées,	divine and popular figures in that country,
se montrèrent dans les nues	showed themselves in the clouds

comme il avait été annoncé.	as had been announced.
Elles lui parlèrent	They spoke to her
avec ces voix de femmes	with a woman's voice,
adoucies et attendries	grown soft and tender
par l'éternelle béatitude.	from (the enjoyment of) everlasting bliss.
Des couronnes étaient sur leurs têtes ;	Crowns were on their heads ;
des anges, pareils à des dieux,	angels, like unto gods,
leur faisaient cortège.	accompanied them.
C'était tout le poème du paradis	It was the whole poem of Paradise
entr'ouvert devant ses yeux.	displayed to her gaze.
Son âme, dans ce divin commerce,	Her soul, in this heavenly intercourse,
oubliait la rigueur de sa mission	forgot the terrors of her mission
et s'abîmait dans les délices	and was overwhelmed in the rapture
de ces contemplations.	of these visions.
Quand ces voix se taisaient,	When these voices ceased,
quand ces figures se retiraient,	when these figures (forms) vanished,
quand ce ciel se refermait,	when the heavens were closed,
Jeanne se trouvait baignée de pleurs.	Joan was found bathed in tears.
'Ah ! que j'aurais voulu,	'Oh ! how I could have wished,
dit-elle elle-même,	she herself said,
que ces anges m'eussent emportée avec eux !...'	that those angels had borne me away with them !'
Mais sa mission terrible	But her terrible mission
ne le voulait pas.	willed it not thus.
Elle ne devait être emportée	She was not to be carried away
où elle aspirait que	where she (so ardently) desired (to go) except
sur les ailes de flamme de son bûcher.	on the wings of the flames of her stake.

XI.

Ces entretiens, ces sommations,	These conversations, these commands (tasks imposed),
ces délices, ces angoisses,	these joys, these tortures,
ces délais durèrent plusieurs années.	these postponements lasted several years.
Elle avait fini	She finished
par les confesser à sa mère.	by telling them to her mother.
Le père et les frères en étaient instruits.	The father and brothers were informed of them.
La rumeur en courait dans la contrée :	The rumour thereof ran through the country :
sujet de merveille pour les simples,	a cause of astonishment to the simple,
de doute pour les sages,	of doubt to the wise,
de sarcasme pour les méchants !	of detraction (scandal) to the wicked !
En ce même temps,	At the same time,
la même idée et les mêmes visions	the same idea and the same visions
travaillaient, en d'autres pays,	inspired, in other countries,
d'autres filles et d'autres femmes.	other maidens and other women.
Quand le peuple n'espère plus rien	When a nation has no longer any hope
des hommes pour son soulagement,	in its men for its relief,
il se tourne vers les miracles.	it betakes itself to miracles.
Il y avait contagion	There was a contagion
de merveilles et de révélations.	in miracles and apparitions.
Une femme du Berry,	A woman of Berry,
nommée Catherine,	named Catharine,
voyait des dames blanches, à robes d'or,	saw ladies in white, with robes of gold,
qui lui ordonnaient	who bade her
'd'aller par les villes	'go through every town
demander des subsides et	to ask for subsidies
des hommes d'armes pour le Dauphin.	and armed men for the Dauphin.
Il fallait que le Dauphin lui donnât	The Dauphin was compelled to give her
des écuyers et des trompettes	squires and trumpeters
pour proclamer partout	to proclaim everywhere
qu'on lui devait apporter	that they must bring him
les trésors enfouis et	the buried treasures
qu'elle saurait bien les découvrir.'	and that she would know very well (where) to find them.'
Ainsi, quand un miasme est dans l'air,	In the same way, when a miasma (plague) is in the air,
tout le monde le respire.	everyone breathes it.
La pitié de la France,	Compassion for France,
la tendresse pour le Dauphin,	affection for the Dauphin,
la haine contre les Bourguignons,	hatred against the Burgundians,
l'horreur de la domination étrangère,	horror for foreign domination,
fanatisaient les femmes.	made the women fanatics.
Toutes entendaient le cri de la terre,	All heard the cry of the country,
quelques-unes les voix d'en haut.	some the voices from heaven.
De plus, les poètes, les romanciers	Moreover, the poets, the romance writers
et les conteurs ambulants du moyen âge	and the strolling minstrels of the Middle Age
avaient habitué les imaginations	had accustomed the imagination
aux rôles belliqueux	to the warlike course (*role*)
joués par des femmes,	played by women,
ainsi qu'on le retrouve	just as we find it
dans le Tasse et dans l'Arioste.	in Tasso and Ariosto.
Elles suivaient leurs amants	They followed their lovers
aux croisades, leur servaient de pages	to the Crusades, served them as pages
ou d'écuyers, revêtaient l'armure,	or as squires, put on armour,
maniaient le coursier,	managed their steed (charger),
versaient leur sang pour leur Dieu,	shed their blood for their religion,
pour leur patrie, ou pour leur amour.	for their country or for their love.
Ces déguisements de la femme	These disguises of women
sous la cuirasse donnaient aux guerres,	under the cuirass gave to wars,
même civiles, un caractère	even (to) civil (wars), a touch
de chevalerie et d'aventures touchantes,	of chivalry and stirring adventures,
de merveilleux romanesque	romantic wonder (or wonderful romance),
qui faisait songer les enfants	which set the children's minds thinking
et devait produire de fréquentes imitations.	and which was destined to produce frequent imitations.
Il se rencontre toujours	There always happens to be
un être d'exception pour réaliser	an exceptional being to embody
ce qui est imaginé par tous.	what is in the minds of everyone.
L'idée d'une jeune fille	The idea of a young girl
conduisant les armées au combat,	leading armies to battle,
couronnant son jeune roi	crowning her young sovereign

et délivrant son pays,	and delivering her country,
était née de la Bible	had sprung from the Bible
et du fabliau à la fois.	and from the *fabliau* at the same time.
C'était la poésie de village.	It was the poetry of the village.
Jeanne d'Arc en fit	From it (*en*) Joan d'Arc
a religion de la patrie.	formed the religion of her country.

Grammatical Notes, Questions, Sentences, and Pieces for Translation to Jeanne d'Arc.

CHAPTER VIII.

Se dé-lass-er, lit. to unweary oneself.

CHAPTER IX.

Ecouter = to listen to. Je l'écoute = I am listening to him. To silence = faire taire or réduire au silence. Silence is the only masc. word ending in *ence*. Note these verbs which govern dative: ressembler à (to resemble), nuire à (to hurt), obéir à (to obey), succéder à (to succeed), plaire à (to please). The *Angelus* is a Latin prayer offered at 6 a.m., at noon, and at 6 p.m. in Roman Catholic Churches. The prayer begins 'Angelus domini nuntiavit Mariae et concepit de spiritu sancto.' S'apitoyer = to affect oneself with pity. Gentil now means *nice* never *genteel* which is *élégant*. Il y a si près de l'âme aux sens (lit., it is so near from the soul to the senses).

CHAPTER X.

Mâle or masculine. S'abîmer (lit., to abyss itself).

CHAPTER XI.

La pitié *de la France* (objective genitive = I pity *France*). Faisait songer les enfants (after *faire* and *laisser* the French do not place the accusative but the verb—mark this construction. *Laissez jouer les enfants*, not, *laissez les enfants jouer*, let the children play). Note *un être*, a being; *un été*, a summer. *Fabliau* is usually a comic verse recital of real or possible events in the ordinary conditions of human life.

(To be continued.)

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Oral Teaching: The Preparation of Lessons and of Notes of Lessons.

BY JOSEPH H. COWHAM, F.G.S.,

Master of Method: Westminster Training College.

CHAPTER II.

The Preparation of a Lesson.—There are very few lessons given by the pupil or student teacher which are not vastly improved by their thorough preparation. Even the commonest subjects of school instruction admit of it. One of the secrets of Dr. Arnold's success as a teacher is found in the fact that although a complete master of the subjects he taught he never faced his class without preparing the lessons for the day. The following among other reasons account for the need of preparation:—

1. **Oral Instruction is a complex effort.**—The teacher must communicate his facts and perform his experiments, he must regulate the observation of his pupils and guide their attempts at reasoning, he must estimate the effect of his teaching by the accuracy or otherwise of the answers given, he must be ready to supplement where he finds their knowledge is incomplete, correct where it is faulty, and throughout the whole he must maintain the logical sequence and continuity of his own thoughts whilst he stimulates into activity the interest and thought of his class.

Now whilst no amount of preparation will enable the novice in the art of teaching to do all this with success it is equally true that the skilled teacher is greatly aided in teaching the most familiar subjects by a careful and immediate preparation.

2. **We take most interest in that which we have recently acquired.** It is moreover reproduced by us with an added life which the recital of what remains of an old lesson never possesses. Thus the revision of an old lesson accompanied by new facts and modern and more apt illustrations imparts a freshness to the lesson as helpful to the teacher as it is stimulating to his class.

3. **Objects, Diagrams, Pictures, and Apparatus** are needed in almost every lesson and when properly used have a powerful effect in sustaining the attention of the class. Some form of object teaching may be introduced into other lessons than those specially termed object lessons. Scarcely a reading lesson is given but would be improved by the introduction of an object or a picture; the writing lesson should appeal to the eye as much as a drawing exercise; first notions of arithmetic are based upon the concrete, and the rules are often best explained by the aid of diagrammatic illustrations; no geography lesson is complete without an array of models, maps, pictures, and specimens. It is thus evident that in nearly all the ordinary subjects of school instruction (grammar excepted) the preparation of apparatus and materials is necessary.

The matter of the Lesson.

Its suitability:—This will be determined largely by the knowledge already possessed by the class. If the lesson be one of a series and given by the regular teacher of the class, the new information will readily be connected with that already supplied and thus be suited to the requirements of the pupils. Should, however, the teacher be new to his class, as is the case with students in practising schools, the teacher's first duty is to acquaint himself thoroughly with the condition of his scholars as to their knowledge of the subject he has to teach.

The amount of knowledge a teacher is able to display is of little avail if the minds of the children are unable to accept it; on the other hand the repetition of old matter will be certain to fall on unwilling ears and thus fail entirely to arouse either the interest or the thought of the class.

Its arrangement:—When by careful study the teacher has thoroughly mastered the subject matter of his lesson so as to be able to state clearly the information he wishes to communicate, and to meet any enquiries his class may start during the progress of the lesson, and when he has enquired into the condition of his class, it is then his duty to arrange his matter in the order best suited for acquisition. His object in this must be threefold (*a*) **to make acquisition on the part of his pupils easy and natural, (*b*) to aid and exercise the work of reproduction, and (*c*) to stimulate and develop, through the efforts of acquisition and reproduction, the intellectual powers of his class.**

In order to secure this threefold object the teacher must arrange his matter in logical order. There is no part of the preparation exercise which will demand higher effort than this. The lesson should be one of a series, so arranged that each lesson, whilst it provides what is new, is related to that which has gone before, and is a preparation for another lesson to follow. The several parts also of each lesson should follow a natural and logical sequence. In a lesson in Grammar, for instance, examples precede rules and definitions; in science, experiments prepare for the establishment of laws; in arithmetic, mental exercises, dealing with concrete cases, lead to the statement of rules; in geography there is the association of related facts, *e.g.*, a mountain range with its termination in a promontory on the coast; a river with the valley it has formed; the productions of a district with the industries of the people and the situation of the towns.

When the teacher is able to secure the co-operation of his pupils in the collection and classification of his facts and examples, and especially when he is able by this effort to lead them to the establishment of general truths and their embodiment in rules and laws, then he places his class in the best possible condition for satisfying the threefold object he has in view.

Black Board Sketch.—An oral lesson should not be considered complete which does not provide an abstract by which the teacher registers on the board the results of his teaching. He cannot make this up satisfactorily as the lesson proceeds. If he attempt it he will probably put down far too much and arrange it so that it becomes more confusing than helpful. He should know exactly what his board sketch is to contain, and how it is to be arranged.

NOTES FOR A READING LESSON.*

STANDARD VI.

A. Subject matter.

'If the sea were a body of water in perfect repose it would be utterly incapable of effecting mechanical erosion. But every one knows that the sea is never absolutely at rest, and that, even in the calmest weather, its surface is ordinarily more or less troubled with waves. | It is easy to understand how these are formed. When you blow upon the surface of a basin of water, the mechanical disturbance of the air is immediately imparted to the liquid and the surface is thrown into a succession of ripples. In like manner, every disturbance of the atmosphere finds its reflex on the surface of the natural waters. | Each puff of wind catches hold of the water and heaps it up into a little hill with the face to leeward, then the crest falls and the water sinks down into a trough, as deep below the mean surface as the hill was high above it; but the next column of water is then forced up, only however to be pulled down again, and in this way the motion of the wave may be propagated across a broad expanse of water. | Drop a stone into a pond, and the same kind of action will be seen; the water all round the spot where the stone falls is first depressed in a little cup, and then rises again, the motion being taken up by the neighbouring water; and a succession of circles, each wider than the last, spreads over the pond, until the ripples at length die away upon the shore. | If any light object, such as a cork, happens to be floating on the surface, it will serve to indicate the motion of the water below. As the waves reach it the cork rises and falls, but it is not carried forward by the movement of the water. Exactly the same kind of action may be witnessed at sea. If a gull, for example, is seated on a wave it is simply rocked up and down, and not moved onwards.'—*Huxley.*

B. Preparation.

(*a*) Divide the paragraph into portions suitable for each reading effort as shown by the vertical lines above.

(*b*) Underline words and phrases requiring explanation, and prepare the form of illustration or statement which will help the class most readily to understand them. *See explanation below.*

(*c*) Read the piece over a sufficient number of times beforehand to be able to set an excellent pattern of reading.

This is best done when, by reading the passage over carefully, the order both of thought and language has become familiar.

(*d*) The class should be prepared by being in orderly arrangement in desks or on the gallery, and by each scholar having his own book.

C. Pattern Reading by the Teacher.

(*a*) Read over the first division of the piece, exaggerating slightly the emphasis upon those words and phrases requiring emphasis: *e.g.*, '**perfect repose**' and '**utterly incapable**' in the first sentence.

(*b*) Expect the scholar to lower his voice at '**repose**' as well as at '**erosion**,' and meet the difficulty by raising the pitch higher than an ordinary reading would require.

(*c*) Show the effect of the pause after '**never**' and '**absolutely**' in intensifying their meaning.

(*d*) Read '**Even in the calmest weather**' as in a parenthesis, lowering the pitch and accelerating the rate.

D. Imitation by the class.

(*a*) Call first upon a good reader.

Children are stimulated to imitate a fellow scholar's successful effort.

(*b*) Allow an inferior reader to follow, and be on the alert to correct faults of expression as well as the more easily recognised errors of pronunciation.

The latter may be corrected by the scholars, the former by the teacher. The corrections by the pupils are generally trivial and of little value, and should be allowed mainly as a device for maintaining their continuous attention.

(*c*) After correction, a faulty reader should be permitted to amend his first attempt.

Do not weary the class by repetition of faulty reading by the same or by other inferior readers, but stimulate to successful effort by an intermixture of good and of faulty readers.

E. Explanation.

The explanation of entirely new and hence unknown words and phrases may be taken before the children attempt to read, *e.g.*, '**Mechanical erosion**;' this is most probably a new idea. Show by illustration its meaning immediately after reading the passage as a pattern, and when the expression is understood, read the entire piece over again. Where, however, the context or previous instruction renders the meaning fairly clear, it is better not to interrupt the reading, but to take the explanation as a distinct portion of the lesson.

For specimen of explanations see the end of the lesson.

F. Continuation and end of the Lesson.

(*a*) After the first half of the subject matter has been read and explained, the remaining half may be taken in the same manner.

(*b*) At the end of each stage of the lesson a revision of the chief points taught should include (a) new words, their spelling and meaning; (b) any passages where special difficulty of pronunciation or expression have been encountered.

(*c*) Close the lesson by a general review, in a conversational form, of the subject matter.

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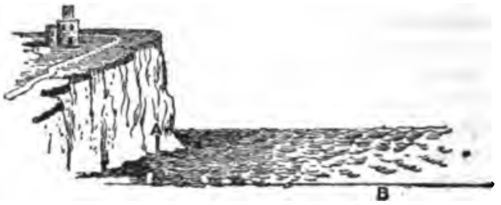
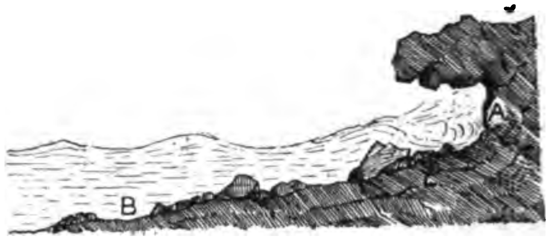
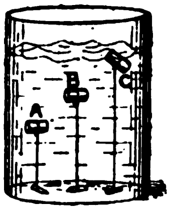
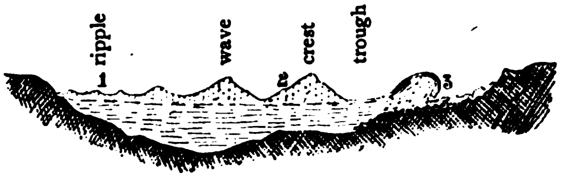
* *These Notes are fuller than those of ordinary MS. Notes. The plan may be followed whilst the amount of matter under each heading is lessened.*

WORDS AND THEIR MEANINGS.	MODE OF EXPLANATION.
1. Perfect repose: Water with a smooth surface.	Show diagram with surface of water undisturbed by winds. 
2. Mechanical erosion: The wearing away of rocks by the action of waves, breakers, and running water. If the class have any knowledge of chemical action, the destruction of rocks by the process of solution may be mentioned for the purpose of contrast.	The diagram below shows the wearing of rocks at A by the action of water. This action is continued along the bottom as far as B. 
3. Absolutely at rest. Appeal to the knowledge children have of the still surface of a pool of water on a calm day and contrast with the ordinary surface of the sea.	
3. The mechanical disturbance of the air finding its reflex on the surface of water: Wind produces similar movements to its own on the surface of the water.	 Blow across a vessel with corks at different depths; the cork on the surface moves with the disturbance of the surface water.
4. Ripple, wave, breaker, crest and trough: Each word is explained by the accompanying sketch **Leeward** is the side of the wave away from the wind.	

Model Answers to Pupil Teacher Examination Papers.

21st April, 1888.

(Continued from June No. of Practical Teacher.)

END OF FIRST YEAR.

Geography.

(*Answer three questions only.*)

MALES AND FEMALES.

1. Describe as fully as you can *one* of these rivers:—The Thames, the Shannon, the St. Lawrence; and name its source, the chief towns on its banks, and its tributaries.

2. Draw a map of the East Coast of England, marking the boundaries of the counties which adjoin the sea on that side, their ports, and chief towns.

3. What do you know of the following places:—Berwick, Torquay, Yarmouth, Wakefield, Brisbane, Ottawa, Melbourne, St. John's?

4. Explain the difference between a *group* and a *chain* of mountains, and illustrate your answer by examples.

(1) The Thames is the chief commercial river of England and of the world. It rises in the Cotswold Hills, in Gloucestershire, not far from the basin of the Severn, and flows generally in an easterly direction for 215 miles to the North Sea, emptying itself by a wide estuary. Its tributaries are, on the left bank, Windrush, Evenlode, Thame, Colne, Brent, Lea, and Roding; and on the right bank, Kennet, Loddon, Wey, Mole, Darent, and Medway. Of these the Medway is the most important. It separates Berkshire from Oxford and Buckingham, Surrey from Middlesex, and Kent from Essex. As the sources of the stream—the Leck, Colne, Charne, and Isis, four small streams—are only slightly elevated, its course is slow, and after heavy rains or quickly melted snow it often overflows its banks in its higher reaches. The district through which it flows is very fertile, and the whole course is renowned for its beauty. The chief towns on its banks are Oxford, Reading, Eton, Windsor, Richmond, Kingston, London, Chatham (Medway), Gravesend. It is navigable for the largest merchant vessels for 40 miles from its mouth, and for barges almost throughout its course, which at Teddington, 60 miles from the sea, is obstructed by locks.

(3) *Berwick:* an ancient border town, at the mouth of the River Tweed, often during the feuds between Scotland and England the scene of great strife; walls and fortifications still in existence; now assigned to Northumberland, and being a quiet market town of 14,000 inhabitants; a small port.

Torquay: situated on the beautiful Torbay, in Devonshire; sheltered from north and east; and enjoys a delightful climate, making it a suitable resort for invalids. About 25,000 inhabitants.

Yarmouth: at the mouth of the Yare, on the coast of Norfolk; celebrated for its herring fisheries. It has 35,000 inhabitants.

Wakefield: a woollen manufacturing town in the West Riding of Yorkshire, on the Calder, about nine miles from Leeds; has lately been created the seat of a bishop's see.

Brisbane: on the River Brisbane, in the south-east of Queensland, of which it is the capital and chief port. 50,000 inhabitants.

Ottawa: the capital of the Dominion of Canada, on the River Ottawa; the seat of government and the centre of the lumber trade. Population 30,000.

Melbourne: the capital of Victoria, Australia, at the mouth of the Yarra Yarra; the largest city, and one of the chief manufacturing towns and ports of the continent. 300,000 inhabitants.

St. John's: the chief town of Newfoundland, on the south-east coast; strongly fortified, with an extensive trade in fish. 250,000 inhabitants.

(4) A *group* of mountains consists of a cluster of mountains whose bases are united, but are not in the same direction, the breadth of the mountain region being as great as its length, as the Cumbrian Group. A *range* of mountains is a series having their bases united and their axes or lines of elevation continuous over a considerable extent of country, as the Pennine Range.

History.

MALES AND FEMALES.

(*Answer two questions only.*)

1. What do you know about the Mission of S. Augustine, and the introduction of Christianity into England?

2. What historical events are associated with the names of these places:—Athelney, Jarrow, Whitby, Canterbury, Glastonbury, Stamford Bridge, Ethandune (*or* Edington)?

3. Say what you know about the divisions of the country, and the principal events, in the reign of Alfred the Great.

(1) Gregory, a monk of Rome, had been constrained to attempt to Christianise England, but was prevented. When he became Pope, he sent Augustine with forty companions on the mission. They landed in Kent in 597 at Ebbsfleet. Ethelbert the king of that division was the most powerful prince in Southern England. He had married Bertha the Christian daughter of one of the Frankish kings in Northern Gaul, and he allowed to her the free exercise of her religion, although himself a heathen. He consented to receive Augustine, and hear what he had to say. This he did in the open air where the spells and enchantments which the strangers might use would, as he supposed, have less power. He was favourably impressed and gave them a house in Canterbury, near which they built a church, Augustine becoming first Archbishop after Ethelbert's conversion which soon took place. The king's example was followed by most of his people, and by 604 there were three sees in the S.E. of England.

(2) *Athelney.*—The retreat of Alfred the Great after his defeat by the Danes in 878.

Jarrow.—The residence of the venerable Bede who wrote here an Ecclesiastical History of England.

Whitby.—The seat of a famous abbey, with St. Hilda as its abbess, the residence of Caedmon the poet; the holding of a Synod in 664, at which Oswy the king of Northumbria decided in favour of the Roman time of celebrating Easter and other points of difference between the northern and southern teachers of Christianity.

Canterbury.—First Archbishopric of England; residence of Augustine the introducer of Christianity from Rome.

Glastonbury.—The scene of the chief events in Dunstan's life.

Stamford Bridge.—Battle between Harold and his brother Tostig, the abettor of Harold Hardrada, King of Norway.

Ethandune.—Defeat of Guthrum the Dane by Alfred the Great, leading to the Treaty of Wedmore.

Needlework.

GIRLS ONLY.

(*One hour allowed for this exercise.*)

Make and stitch a band (four inches in length). Make two different-shaped buttonholes.

END OF SECOND YEAR.

MALES AND FEMALES.

Geography.

(*Answer three questions only, including the last, if you can.*)

1. Name the principal divisions of British India, and say what you know about one of them.

2. Draw an outline map of Italy, *or* of Spain and Portugal, and show in it the courses of three rivers, and the positions of six important towns.

3. Name the boundaries, chief imports and exports, and the principal towns and rivers, of Russia in Europe.

4. Say what you know about each of the following:—Dijon, Florence, Granada, Nuremburg, Delhi, The Hoogly, and The Deccan.

5. What is the difference of time between London and a place whose longitude is 25° E.? Account for this difference, and give the latitude and longitude of London and three other places.

(1) The principal divisions of India are—(1) The territories directly governed by the British; (2) Tributary States; (3) Independent States; (4) French and Portuguese Possessions.

The British possessions were formerly divided into three presidencies—Bengal, Bombay and Madras, but for purposes of Government the Bengal presidency is now sub-divided, and the groups of provinces are placed under:—(1) The Governor General; (2) The Lieut. Governor of Bengal; (3) Lieut. Gov. of N.W. Provinces; (4) Lieut. Gov. of Punjaub; (5) Chief Commissioner of Central Provinces; (6) Chief Com. of Burmah; (7) Governor of Bombay; (8) Governor of Madras.

Each of these Governors has the charge of the British States and the feudatory states grouped about them. Thus the Governor of Bombay presides over the affairs of the Deccan, Concan, Gujerat and Sind, belonging to England, and the feudatory states—Gincowar's Territory, Kattywar States, Cutch Kolapore and others, occupying the whole of the western shores of the peninsula watered by the Indus, Nerbudda, and Tapty, and having the large town of Bombay as its seat of Government.

(3) *Boundaries.*—North by the Arctic Ocean; East by the Petchora, Ural Mountains and Ural River; South by the Caucasus Mountains, the Black Sea; West by Roumania, Austria, Germany, Baltic Sea Sweden.

Imports.—Coal, manufactured iron, steel, woollen and cotton goods, cotton yarn, sugar, colonial produce generally, indigo.

Exports.—Corn, flax, hemp, timber, oil, leather, tar, pitch, turpentine, potash, copper, tallow, wool, and furs.

Towns.—St. Petersburg, Moscow, Warsaw, Odessa, Riga, Kief, Astrakhan, Cronstadt, Nijni-Novgorod, Taganroy, Archangel, Tula, Vilna, Saratof.

Rivers.—Northern Dwina, Petchora, Western Dwina, Neva, Vistula, Volga, Don, Dnieper, Dniester, Ural.

(4) *Dijon.*—A town of 40,000 inhabitants in France, at the confluence of the Onche and Suzon; chief depôt for the sale of Bergundy Wines.

Florence.—On the Arno in Central Italy, celebrated for its university, some of the finest art galleries in the world. Michael Angelo and Dante were natives; 170,000 inhabitants.

Granada.—The old Moorish capital of Spain, on a tributary of the Guadalquiver; palace of the Alhambra; 70,000 inhabitants.

Nuremburg.—In Bavaria, on the Pegnitz; noted for watches, clocks, and jewellery; birthplace of Albert Durer; 90,000 inhabitants.

Delhi.—The former capital of the Great Mogul Empire, situated on the river Jumna, well fortified and surrounded by walls; siege in 1857; population 150,000.

The Hoogly.—The principal of the branches into which the Ganges divides at its mouth; Calcutta, capital of India, stands on its banks.

The Deccan.—The part of the peninsula of India bounded by the Nerbudda on the N., the Kistnah on the S., and the Ghauts on the E. and W. It forms a large plateau across which flows the Godavery.

(5) The time of London is one hour and forty minutes behind that of a place 25° E.

The earth takes 24 hours to perform a revolution round the sun. It thus travels at the rate of 15° per hour (the circumference being 360°) or 1° in 4 minutes. As the earth revolves from W. to E. the meridians E. of London come under the sun before that of London itself, and 25 × 4′ = 100 minutes the difference of time.

London,	Lat.	51° 31′ N.	Long.	0° 5′ W.
Paris,	,,	48° 50′ N.	,,	2° 21′ E.
Rome,	,,	41° 54′ N.	,,	12° 30′ E.
Constantinople,	,,	41° 1′ N.	,,	28° 58′ E.

History.

(*Answer three of these questions.*)

MALES AND FEMALES.

1. Who were the most important personages, and what were the most important events, in the time of Edward III.?

2. What happened at Evesham, Nevil's Cross, Crecy, Agincourt, Runnymede, Bosworth, and St. Albans, respectively?

3. Mention, with exact dates, eight of the most memorable events which occurred in the Tudor period.

4. Tell what you know about these persons:—Warwick (the king-maker), Drake, Chaucer, De Montfort, Sir Philip Sidney, Joan of Arc, Wyclif, and Thomas Cromwell.

(1) The chief personages in the time of Edward III. were the king himself, his queen, Philippa of Hainault, John Baliol, and Robert Bruce, Philip of Valois, and his son John, David II., King of Scotland, and Edward Baliol, the Black Prince, Pedro, King of Spain, Isabella, the Queen Mother, and Mortimer, Earl of March.

The chief events of the reign were the treaty of peace with Robert Bruce, the overthrow of the power of Mortimer and Isabella, the battle of Halidon Hill, 1333, the beginning of the wars with France, 1338, Battle of Sluys, 1340, Battle of Crecy, 1346, and Nevil's Cross, 1346, the ravages of the Black Death, Battle of Poictiers, 1356, Treaty of Bretigny, 1360, the division of Parliament into two Houses.

(2) *Evesham*: Battle in which Simon de Montfort was defeated and slain by Prince Edward, afterwards Edward I. 1264, A.D.

Nevil's Cross: David II., of Scotland, defeated and taken prisoner by Queen Philippa, wife of Edward III. 1346. (Oct. 17).

Crecy: Defeat of Philip of Valois by Edward III. and the Black Prince. 1346. (Aug. 26).

Agincourt: Battle in which Henry V. defeated the French in 1415. (St. Crispin's Day, Oct. 23).

Runnymede: The signing of Magna Charta by King John. 1215. (June 15).

Bosworth: Battle in which Richard III. was defeated by Henry, Earl of Richmond, afterwards Henry VII. 1485. (Aug. 15).

St. Albans: Battles between Houses of York and Lancaster, 1455; the Lancastrians defeated and Henry taken prisoner, 1461—Margaret defeated Warwick, and released the King.

(3)

1.	Discovery of the New World by Christopher Columbus	1492
	And Cabot, in	1497
2.	Field of Cloth of Gold	1520
3.	Loss of Calais	1554
4.	Reformation in Germany and England:—	
	Luther published his 95 propositions ...	1517
	Henry became Defender of Faith ...	1521
	Final breach between England and Rome...	1535
	Marian Persecution	1555-58
	Establishment of Church of England ...	1562
5.	Drake's voyage round the world	1577-80
6.	Execution of Mary, Queen of Scots ...	1587
7.	Armada defeated	1588
8.	Establishment of East India Company ...	1600

(4) *Earl of Warwick* first joined the cause of the Duke of York, helping to gain the battle of St. Albans, taking Henry VI. prisoner. He was also victorious at Bloreheath and Northampton, but was defeated by Margaret at the second battle of St. Albans, 1461. He quarrelled with Edward and joined Margaret. He was killed at Barnet in 1471.

Drake, Sir Francis, one of the most famous naval commanders of the reign of Elizabeth, was employed first against the Spaniards in the New World (1570-2), and destroyed their fleet at Cadiz, 1587, assisted in the destruction of the Armada, 1588. He had previously sailed round the world, being the first Englishman to do this. He died in 1595 in S. America.

Chaucer, Geoffrey (1328—1400), the first great English poet, wrote the Canterbury Tales. He lived at the courts of Edward III. and Richard II.

De Montfort, Simon, Earl of Leicester, brother-in-law of Henry III., with whom he quarrelled. He led the barons in their revolt against the King, and their attempts to reform the State. He defeated the King at Lewes, 1264, but was himself defeated and killed at Evesham in the following year.

Sir Philip Sidney, a young accomplished soldier, who fell at the battle of Zutphen, in the Netherlands, in 1586. He wrote a prose romance called 'Arcadia.'

Joan of Arc, a peasant girl, who by professing inspiration from heaven, put new life into the French, and rescued France from the hands of the English, 1429—1431. She was burned as a witch by the English at Rouen.

Wyclif, John, Professor of Divinity at Balliol College, Oxford, and rector of Lutterworth. He preached against the errors of the Church of Rome and translated the Bible into English. He was the first English Reformer. He died in 1384.

Thomas Cromwell was at first a clerk in Antwerp, but became a lawyer in England, and a friend and assistant to Wolsey, by whom he was recommended to Henry VIII. On the death of Wolsey he became one of Henry's chief advisers, assisted in the destruction of the monasteries, and afterwards incurred the King's displeasure. He was executed for high treason in 1540.

Teaching.

MALES AND FEMALES.

(*Answer two questions only.*)

1. What use could you make of a threefold ruling of the lines, on a child's slate and on the teacher's blackboard, in order to show more clearly the forms and proportions of letters, and the mode of joining them? As an example, take the word *cathedral*, and write it in large hand, after making three parallel lines for the copy.

2. In using pattern reading, so as to give the correct tone and expression, say whether you would employ it at the beginning or the end of your reading lesson, and give your reasons.

3. Give eight examples of useful mental exercises on number for young children, the highest number not to exceed 30.

(1) The blackboard would be ruled in the same way as the slate. Then attention would be called to each letter as it was written on the blackboard, care being taken to show that each up stroke of a letter joined the following letter at the middle line, with the exception of the one between the *t* and the *h* which joins at the top line. The commencement of the *o* in the *a's* and the *d* would also be made at the middle line.

[NOTE.—As directed the word *cathedral* would be written and the above points indicated.]

(2) It would all depend upon the nature of the subject, and the age of the class.

Young children need a pattern at the beginning of a lesson. They have not been taught to read, and by giving a pattern at the beginning, they form habits of correct expression, enunciation, and emphasis.

With elder children the pattern will more often be best when the lesson has been examined and is understood. In some lessons the want of tone and expression may be felt only in a few sentences of the lesson. Then the pattern should be given when the faults are found.

(3) Add 19 and 11 and take away 10. How many girls could get 6 oranges each out of 30? How many apples would each of 5 girls get out of 25? Into how many heaps could I put 24 coins, 8 in each heap? 15 girls got 2d. each given to them, how many shillings was that? How much less than 3s. would that be? Ten girls each pay 2d. per week school money, how many more pennies would make 2s.? Which is most, 29 pence or 2s. 5d.?

Needlework.

GIRLS ONLY.

(*One hour allowed for this exercise.*)

Join by a sew and fell seam two pieces of calico, insert a gusset as for the side of a man's shirt.

END OF THIRD YEAR.

Geography.

MALES AND FEMALES.

(*Answer three questions only, including the last, if you can.*)

1. Say what you know about China, as regards its people, productions, industries, and chief places of interest.

2. Draw a map of the Northern part of Africa, so far as to show the States bordering on the Mediterranean. Say also how they are respectively governed, and by whom.

3. Say what you know about: Borneo, Aden, Burma, Afghanistan, the Gold Coast, Cairo, Bechuana Land, Abyssinia.

4. What are the causes of winds? What is meant respectively by Variable winds, Periodical winds, Trade winds? How may Trade winds be accounted for?

(1) The people of China are nearly four hundred millions in number. They are yellow skinned with black hair which is allowed by both sexes to grow to a great length behind. They are flat featured and their eyes are diagonally set in their sockets. They are an industrious people, placid and affable in disposition, but artful and cunning; the ruling classes are intelligent but unprincipled. The murder of infants is said to be common. Their ideas of female beauty causes them to deform the feet of female children. They are very much averse to foreigners and until lately held little intercourse with the outside world.

The productions of China include tea, silk, and rice; the orange, tamarind and mulberry tree are grown; gold, silver, quicksilver, zinc and coal are the chief minerals; and a fine kind of clay is manufactured into the best of porcelain.

The people are very largely engaged in agriculture, which has been brought to a great degree of perfection, while silk, porcelain, cotton and paper employ large numbers.

Among the objects of interest are the Great Wall on the northern frontier, the Imperial Canal 700 miles long, the pagodas, palaces, and most of the large towns, many of which are walled.

(2) *Egypt* is governed by a Khedive whose power is absolute although he is nominally subject and pays tribute to Turkey. The title is hereditary. Tewfik Pasha is the reigning sovereign.

Tripoli, a villayet or province of the Ottoman Empire under the governor generalship of a pasha (Admed Rassim). The government of all Ottaman countries is an absolute despotism.

Tunis, nominally under a Bey, but really a dependency of France, the power being in the hands of a French Resident who collects the taxes and pays the Bey a subsidy.

Algeria, a French province under a governor general.

Morocco, an absolute monarchy under a sultan (Mulai Hassan).

(3) *Borneo*, next to Australia, is the largest island in the world, and lies directly south of the equator and east of Sumatra, and the Malay Peninsula. It is divided into a number of petty states, a British Trading Co. having power in the north. The chief ruler is a sultan. Its capital is Bruni on the N.W. coast.

Aden, a strong seaport of Yemen, at the entrance to the Red Sea. Of importance as a coaling station to the British, to whom it belongs. Perim, a small island in the strait, is also under the same governor as Aden.

Burma, a state of the peninsula of Further India, about twice the size of the British Isles, watered by the Irrawaddy and its tributaries, partially ceded to Britain in 1824 and 1856. The remainder occupied in 1886.

Afghanistan occupies a position to the N.W. of India, with Beloochistan on the S., Turkestan on the N., and Persia on the W., consists of a series of high valleys and tablelands, occupied by a rude race of mountaineers, under an Ameer or King.

Gold Coast, a portion of the coast of Upper Guinea so called from its producing gold in small quantities; under British rule; Cape Coast Castle, Elmina and Accra being the chief settlements.

Bechuana Land, a large district north of the Gareep or Orange river in South Africa, now under British protection.

Abyssinia, a country of North Africa, situated south of Nubia on the highlands S.W. of the Red Sea. Consists of a series of plateaus with high mountain ranges, the highest being about 15,000 ft. Capital, Senaar.

(4) Winds are caused by the variation of the temperature of the atmosphere. If the atmosphere becomes heated it expands, becomes lighter and ascends. To restore the equilibrium, the cold air rushes to fill up the space, and winds are caused.

Variable Winds are inconstant in their action, and do not blow at any stated periods or in any particular direction.

Periodical Winds are such as blow at stated periods and in certain directions.

Trade Winds are periodical winds which blow on either side of the equator and were so called because of their influence on ships engaged in trade. Trade winds are caused by the heating of the atmosphere in the region of the equator. A constant stream of air blows from the N. and S. to occupy the place of the light expanded air near the equator. Owing however to the rapidity of the motion of the earth at the equator the winds are as it were left behind, and thus become N.E. and S.E. winds.

History.

(*Answer three questions only.*)

MALES AND FEMALES.

1. What do you know about these persons respectively:—Bacon, Hampden, Milton, Monk, Buckingham, Monmouth and Marlborough?

2. Recount in order, with dates, the chief incidents of the war between Charles and his Parliament.

3. Name the chief events in the reign of George II., and say what made the last year of that reign especially memorable.

4. Say what you know about the Slave Trade and its abolition.

(1) *Francis Bacon*, Lord Chancellor, Baron Verulam, and Viscount St. Albans, was a friend of the Earl of Essex, by whom he was introduced to James I.; assisted James by his advice in the management of Parliament; was made Lord Chancellor, but was impeached, convicted of corruption, and degraded from his office. He wrote a number of philosophical works, the chief being his 'Novum Organum.' Died in 1626.

John Hampden, one of the chief supporters of the Parliamentary party during the Civil War of 1642. He resisted the illegal levying of ship-money, was tried and compelled to pay. Was one of the five members whom Charles attempted to seize in the House of Commons. He raised a Buckinghamshire regiment and reinforced the Parliamentary army after the defeat of Edgehill. Was killed in the engagement at Chalgrove Field in 1643.

John Milton, Latin secretary to Oliver Cromwell during the Commonwealth; the greatest modern epic writer; chief works —'Paradise Lost,' and 'Paradise Regained,' 'Comus,' 'Lycidas,' 'Samson Agonistes,' 'L'Allegro' and 'Il Penseroso.' Died 1674.

General Monk was employed by Cromwell to reduce the Royalists in Scotland. After Cromwell's death, effected the restoration of Charles II., whom he received at Dover. Was created Duke of Albemarle; afterwards commanded the fleet, and was employed against the Dutch.

Buckingham, Duke of, George Villiers, gained the affection of James I. and was rapidly promoted; went with Prince Charles to bring home the Infanta from Spain; disgusted the Spaniards and the match was broken off; fitted out an expedition against the Protestants of Rochelle; was impeached by the Commons; assassinated by a man named Felton, at Portsmouth, 1627.

Monmouth was a natural son of Charles II. He defeated the Covenanters at the battle of Bothwell Bing, intrigued against the King, but was pardoned; he afterwards invaded England (1685), and was defeated at Sedgemoor, taken prisoner and executed.

Marlborough, Duke of, joined the Prince of Orange, whose confidence he gained, and by whom he was employed in Ireland. In Anne's reign he gained victories at Ramilies, Oudenarde, Malplaquet, and Blenheim; was afterwards impeached and disgraced.

(2)	Charles attempted to seize the five members, who escaped	1642
	Charles fled to York	,,
	Commons demanded that the King should give up command of the army	,,
	Attempt to seize Hull	,,
	Royal Standard raised at Nottingham (Aug. 25)	,,
	Battle of Edgehill (indecisive)	,,
	Charles wintered at Oxford	
	Battles of Chalgrove Field (Hampden wounded, Atherton Moor (Royalists victorious), Siege of Gloucester, Battle of Newbury (Parliamentarians victorious)	1643
	Battle of Marston Moor (Cromwell victorious)	1644
	Second battle of Newbury (indecisive)	,,
	Battle of Naseby (Charles routed)	1645
	(This battle ended the first Civil War).	
	Insurrection in favour of Charles	1648
	Cromwell defeated the Scotch army at Preston	,,
	Charles was delivered up to the Parliament, tried and executed	1649
	Walpole wanted to pass an Excise Bill	1733
	Porteous riots in Edinburgh	1736
(3)	War declared against Spain	1739
	Founding of Methodist Societies	,,
	War of the Pragmatic Succession	1741–45
	Battle of Dettingen	1743
	Young Pretender's rebellion	1745
	Battle of Falkirk	1746
	Seven Years' War	1756–63
	The last year of the reign is made memorable by the capture of Quebec, and the total destruction of the French power in North America.	

(4) The slave trade was begun by the Portuguese in 1481. Since that time it has devastated a large part of the East and West of Africa, and was carried on for nearly 250 years. Sir John Hawkins began the slave trade in England in 1562, and it grew so extensively that in 1786 England employed 150 ships and carried off above 40,000 slaves. Then a society was formed for the suppression of the slave trade by Clarkson, Wilberforce, and Dilwyn. The question was debated in Parliament in 1787, 1792, and 1798, when Mr. Wilberforce's motion for its abolition was defeated by a small majority. Finally it was abolished in 1807. Since that time England has employed her ships to put down the slave trade; slavery itself has been abolished in the British possessions and the United States; but it is still practised, and the slave trade is still carried on in Africa.

Teaching.

(Answer two questions only.)

1. Write out notes of a lesson on *one* of these subjects :—(*a*), the sea; (*b*, for Infants), a Farm Yard.

2. Show how you would give to children of the Third Standard, a first lesson on the different uses of adjectives and adverbs. Say what illustrations you would use, and whether you would use them at the beginning or towards the end of your lesson.

3. (*For Infants.*) Say how you could, either by paper folding or by simple drawing, make the properties of the square visible to young children, and explain what are the uses of such a lesson.

4. Sketch out a plan of the village or part of the town in which your schoolroom is situated, and explain how you could make such a sketch useful as a first lesson on geography, and on the meaning of a map.

THE SEA.

(1) (*a*) *What we mean by the Sea.*—Ascertain if any of the children have been to the seaside. Get their ideas of the sea, and, if possible, the definition that we mean the whole body of salt water which covers three-fourths of the surface of the earth.

(*b*) *Area and Divisions.*—(Use map of the world); show area to be ¾ of whole surface, 145,000,000 sq. miles nearly. Division : Atlantic, Pacific, Indian, Arctic, and Antarctic. Compare sizes and shapes of these on the map.

(*c*) *Remarkable Features* connected with the sea :

1. *Saltness*, caused by beds of salt in bottom of the ocean. Prop. 3½ per cent.
2. *Colour*, open sea, blue; shallow water, green; in mid-ocean, black; Red Sea, reddish; Gulf of Greece, white; China Sea, yellow.
3. *Restlessness*, tides, currents, waves. (These can only be mentioned, not fully treated.)
4. *Temperature* changes on the depth; mention Gulf stream; freezing point lower than fresh water.

(*d*) *Value and Uses of the Sea:*

1. Moderates the temperature (show how).
2. Good means of communication.
3. Source of rain, vapour, clouds, &c.
4. Supplies us with food and pleasure.

(2) I should place some article before the children at the *beginning* of the lesson, and, by questioning, get from them the words which would describe the article. This I should repeat with other articles, and show that there are words which describe nouns, that is *adjectives*.

Then I should show specimens of writing, and some would tell me how the writing had been done. From this I should show that there were words which qualified words denoting action (verbs). These words are *adverbs*.

Having done this I should put a list of nouns on the black board, getting adjectives to qualify them; then a list of verbs with adverbs to qualify. Then a miscellaneous list; and, lastly, sentences with adjectives and adverbs required.

(3) As a first illustration, paper folding would be the best for showing the properties of a square. By folding a square piece of paper before a class the children might see first that the opposite sides were alike, and that the angles were alike, then that the contiguous sides were the same, that halves of opposite sides were the same. Then it might be shown that to be a square one side must be at right angles to another. A square should then be drawn on the blackboard, as a further illustration.

The giving of such a lesson is of practical value in developing the faculties of observation. If children also have papers given to them or pencils to draw, of imitation also.

(4) (*Latter part.*) A plan of the schoolroom enables a teacher to show the relationship between lines of various lengths, to give an idea of proportion, and to show generally that large surfaces may be represented by smaller ones, the shapes being the same. Direction also may be taught by it; the meaning of a plan is better understood by a sketch than by a verbal description. From the plan we can proceed to the village, the town, the county, a country, a continent, and the world.

Geography.

MALES AND FEMALES.

(Answer three questions only, including the fourth, if you can.)

1. Name the planets, and give any particulars you can respecting their sizes, their distances from the sun, and the periods of their revolution.

2. What countries and parts of countries are included in the south temperate zone? Illustrate your answer by a map.

3. Give such particulars as you can respecting the following places:—Washington, Buenos Ayres, Tahiti, Mecca, Nice, Adelaide, Munich, the Crimea.

4. Explain, as to a class of children, the meaning of these terms:—*A tidal river, spring-tide, high water, neap-tide.*

(1) 1. *Mercury*, 36 million miles from the sun; revolves in 88 of our days. Its diameter is about 3,000 miles.

2. *Venus*, called also Vesper and Lucifer, 7,550 miles in diameter. Revolves round the sun in 224 days, at a distance of 67 millions of miles.

3. *The Earth*, nearly 8,000 miles in diameter; 365 days; mean distance, 93 million miles.

4. *Mars*, mean distance 139 million miles, 686 days in revolution; about 4,000 miles in polar, 4,900 equatorial diameter.

(The above are the interior planets. The asteroids intervene between Mars and Jupiter.)

5. *Jupiter*, mean distance, 479 million miles; 83,000 miles in polar, 88,000 equatorial diameter; revolution 11 yrs. 10 ms. It is 1,400 times the size of the earth.

Saturn, mean distance 870 million miles; 65,000 miles and 72,000 miles polar and equatorial diameters; revolution 30 years.

Uranus, 1,753 million miles from the sun; diameter, 32,000 miles, and period of revolution 84 years.

Neptune, 2,746 million miles from the sun; 37,000 miles in diameter, and period of revolution 160 years.

(2) In South America: Argentine Republic, or La Plata, Paraguay, Uruguay, Chili, Patagonia, and part of Brazil.

In Africa: Cape Colony, Natal, and the Transvaal, part of Madagascar.

In Australia: parts of West Australia, South Australia, and Queensland; New South Wales, Victoria, New Zealand.

(3) *Washington*, on the Potomac, in the district of Columbia, named after George Washington; seat of Government of the United States; fine buildings, the Capitol and White House. The name is also given to a territory in the N.W., and to some 100 counties and towns of the States.

Buenos Ayres, capital of one of the States of the same name of the Argentine Republic, founded by the Spaniards, well fortified, has great trade, and is one of the largest cities of S. America.

Tahiti, the largest of the Society Islands in the S. Pacific, belongs to France; grows bread-fruit, yams, cocoa-nuts, arrow-root, &c. Papiete is its chief town.

Mecca, capital of Hedjaz, in Arabia, situated in a narrow valley debouching on the Red Sea. The birthplace of Mahomet in 569; the holy city of the Mussulmans; has a splendid temple with the shrine of the prophet. Visited yearly by many pilgrims.

Nice, city and seaport of France, beautifully situated on the Mediterranean, in the department of the Maritime Alps. Much frequented for its mild climate.

Adelaide, capital of W. Australia, on the Torrens River, near the St. Vincent Gulf; named in honour of Queen Adelaide, consort of William IV.

Munich, on the Isar, capital of Bavaria; has many elegant buildings, libraries, collections of sculpture, university. 200,000 inhabitants.

The Crimea, a peninsula in the S. of Russia, stretching into the Black Sea; joined to the mainland by the isthmus of Perekop; southern part very fertile; noted as the scene of the war with Russia, 1854—55.

(4) (*a*) *A tidal river* is one up which the tide flows twice a day.

(*b*) *Spring tide* is the tide course when the sun, moon, and earth are in a straight line. As the sun and the moon both attract the waters of the earth, their influence is thus united, and a high tide, called spring tide, is produced.

(*c*) *High water* is the name given to the highest point reached by the tide just before the tide begins to ebb.

(*d*) *Neap tide* is the low tide which results from the attraction of the sun and moon being exerted in directions at right angles to each other.

(Diagrams would be drawn to illustrate *b* and *d*, and instances given of *a*.)

Needlework.

GIRLS ONLY.

(*One hour allowed for this exercise.*)

Make up a square of calico (nine inches) in the shape of a working woman's apron, showing the following stitches, viz.: Hemming, sewing, and gathering or pleating. Sew on tapes.

END OF FOURTH YEAR.

History.

MALES AND FEMALES.

(*Answer three question only.*)

1. State in detail the reasons which make the following places memorable in English History:—Plassy, Chalgrove Field, Glencoe, Dettingen, Quatre Bras, Lexington, Londonderry, Sedgemoor.

2. Give in chronological order, with dates, the chief events of the period from 1801 to 1820.

3. What additions were made to our Dependencies and Colonial Possessions in the 18th century?

4. Name three of the most famous writers, and three of the most famous statesmen, in each of the following reigns:—(*a*) Elizabeth, (*b*) Anne, (*c*) Victoria.

(1) *Plassy:* battle fought between the British under Clive, and the Hindoos under Sarajah Dowlah, 23rd June, 1757. The nabob with 68,000 men was defeated by the English with 1000 and 2000 sepoys. The victory laid the foundation of our empire in India.

Chalgrove Field: memorable as being the place where John Hampden, one of the leaders of the Parliamentary Army, was mortally wounded on 18th June, 1643.

Glencoe: memorable as the scene of the massacre of the clan McDonald, whose chief had not submitted to William III. in sufficient time. Over 60 men were killed, 13th February, 1692, and many women and children perished in the snow.

Dettingen: George II. defeated the French on June 16, 1743, in the war of the Pragmatic Succession. It was the last battle in which an English sovereign fought in person.

Quatre Bras: on the 16th June Marshal Ney was repulsed by the British; the Duke of Brunswick was killed; two days later Napoleon was finally defeated.

Lexington: the actual beginning of the American War of Independence took place here on April 19th, 1775, a number of American riflemen attacking a detachment of British soldiers who were about to seize some stores of war.

Londonderry: noted for its siege by the Irish Catholics after the Revolution in 1688. For many months the Protestants held the town for William III., suffering great hardships, but were finally relieved in 1861.

Sedgemoor: defeat of the Duke of Monmouth who had landed in Dorset with the expectation of being assisted to the throne, June, 1685. It was the last battle fought on English ground.

(2)

Legislative Union of Ireland and Great Britain ...	1801.
Battle of Copenhagen	,,
,, Alexandria	,,
Peace of Amiens	1802.
Renewal of War with France	1803.
Pitt again Prime Minister	1804.
Crowning of Napoleon I.	1805.
Battle of Trafalgar	,,
Peninsular War	1808—1814.
Victories at Vimiera, 1808, Corunna, 1809, Talavera, 1809, Ciudad Rodrigo, Badajos, 1812, Vittoria, 1813.	
Walcheren Expedition	1809.
Napoleon confined in Elba	1814.
Escape, and Battles of Quatre Bras and Waterloo—Banishment of Napoleon	1815.
Bombardment of Algiers	1816.
Manchester Massacre	1819.
Cato Street Conspiracy	1820.

(3) Canada, Prince Edward Island capitulated; St. Vincent, Cape Breton, Dominica, and Grenada were ceded; the settlement of New Brunswick was effected; Gibraltar was captured; New S. Wales, Sierra Leone, and Prince of Wales Is. were settled; the power of England was very largely increased in India.

(4) *Elizabeth.*
Writers: Spencer, Shakespeare, and Bacon.
Statesmen: Lord Burleigh, Leicester, and Essex.
Anne.
Writers: Addison, Steele, Sir Isaac Newton.
Statesmen: Marlborough, Godolphin, Harley, St. John.
Victoria.
Writers: Carlisle, Tennyson, Macaulay.
Statesmen: Gladstone, D'sraeli, Palmerston.

Teaching.

MALES AND FEMALES.

(*Answer two questions only.*)

1. Write out a sketch of a lesson on *one* of these subjects, and state what illustrations you would require to make such a lesson effective:—

(*a*) The Herring Fishery.
(*b*) The Manufacture of Steel.
(*c*) The Parts of a Simple Sentence.
(*d*) *For Infants.* A Coal Mine.
(*e*) *For Infants.* The Colours of the Rainbow.

2. How can spelling be best learned, orally or by writing, or by any other plan? Say how you can secure the right spelling of the difficult words in a reading lesson, without interrupting the reading too much, or making the exercise uninteresting.

3. Classify the letters of the English alphabet according to the difficulty of writing them, and the order in which they should be taught. Describe, also, the best way you know of *ruling* slates and copy-books for the younger children.

4. *For Infants.* Of the three simple manual employments—building, plaiting, and elementary drawing—which do you think most helpful in the education of a child, and why? Explain how you would use and vary the exercise you prefer.

(1) (*a*) Illustration and apparatus: small net, with floats and weights (made from corks and lead by teacher); picture of boat or fleet of boats; a herring. Blackboard and chalk.

(*b*) Some articles made of steel, iron ore, steel in various stages of manufacture; picture of furnace, &c., in steel works. Blackboard, &c.

(*c*) Blackboard and chalk.

(*d*) Picture of a coal mine; safety lamp or picture; coal, blackboard, &c.

(*e*) Picture of a rainbow; threads of various colours and shades to arrange as for a rainbow; a prism.

(*a*) The Herring Fishery:

1. *Methods of catching Fish.*—Rod and line with hook, nets, spears. Herring caught by nets.

2. *Boats and Men.*—Describe fishing boat, broad of beam, black sails, well for fish; men, hardy, inured to danger, carrying long nets; little convenience for them.

3. *Localities, &c.*—Herring caught chiefly round British coasts (Yarmouth, Grimsby, N. Shields, Pell, the chief stations); swim in shoals; months of June to September.

4. *How caught.*—Boats go out chiefly at night; cast their nets, floats, and weights, keep them upright; fish caught in attempting to pass through the nets by gills; nets drawn up and thrown into well of boat, boats taken to shore, and nets cleared.

5. *Supply.*—Inexhaustible; affords employment to thousands; finds food, good and cheap, for many more.

(*d*) A Coal Mine (for Infants):

1. *Use of Coal.*—Refer to fire, need for it on cold day. How made and kept going. By coal chiefly. What is coal?

2. *Where found.*—Like black stone, but not found in quarries; men have to dig for it deep down in the earth, place called a mine.

3. *Parts of a Mine.*—Shaft (describe); seam of coal (illustrate by three books, black one in middle, also draw on blackboard); mine has streets crossing each other (draw); little railways.

4. *How Coal obtained.*—Men hew, blast with powder, coal falls, filled in tubs or waggons, drawn up in a cage by steam engine (show picture).

5. *Miners.*—Live a hard life under ground; no light but from a little lamp; work dangerous; should be thankful for their labour.

(2) (*a*) The best method of learning spelling is by a proper combination of oral and written work. Transcription is useful for accustoming the eye to make the words letter by letter. Oral spelling tests the memory; dictation both writing and memory. The rules upon which the spelling of words is based may also be given with good effect, such as those for doubling the final consonant, dropping or retaining the *e*, when the syllable *ing* is added. No one plan is suitable in every instance. (*b*) By having the words committed to memory and their meanings given before the reading lesson commences, or after it terminates. The former method is preferable.

(3) (*a*) (1) i, u, m, n, w, v.
(2) t, l, p, b, h.
(3) o, a, d, q, j, g.
(4) e, c, f.
(5) s, x, y, z, r, k.

(*b*) Slates. Double lines for the writing, with a heavier line to mark the height or depth of the letters. Squares for figures.

Copy books. Double lines for the writing, with a faint mid-line to show where the letters should be joined. Also lines deeper or of another colour, to show the height and depth of the long letters. An occasional line to mark the slant.

(4) Drawing is perhaps the best. It trains the eye and the hand, and necessitates close observation, and developes the faculty of imitation. It also assists in writing, and can be applied afterwards to a great variety of purposes.

I should use the blackboard largely, beginning with lines, horizontal, vertical, oblique; then I should combine these in various ways, making them of various lengths. I should build up every figure a little at a time, so that it would be easy for the children to follow and to imitate. I should apply these lines to different sorts of common objects.

Needlework.

GIRLS ONLY.

(*One hour allowed for this exercise.*)

Make the sleeve of a baby's night-gown, plain-stitch or feather-stitch the wristband.

—o—

Publications Received.

Bell, G., and Sons—
History and Geography Examination Papers. By C. H. Spence, M.A.
Livy, Book XXII. With Notes by the Rev. Launcelot Downing Dowdall, M.A.

Blackie and Son—
Euclid, Book III. By A. E. Layng, M.A.
Poynter's Drawing for the Standards, Nos. 25, 26, 27 and 28.
Sonntag's French Grammar. Part III.

Blackwood, W., and Sons—
Accent and Rhythm explained by the Law of Monopressures. Part I.

Cassell and Co.—
Cassell's Coloured Historical Wall Sheets.
First Elements of Experimental Geometry. By Paul Bert.

Chambers, W. and R.—
Recitations for Infants.

Curwen, J., and Sons—
The Musical Profession. By Henry Fisher, Mus.Doc.

Heywood, John—
Lamb's Tales from Shakspere. By A. Gardiner.
The Swiss Family Robinson. By A. Gardiner.
The Standard Arithmetic. Part II.
The New Graded Arithmetic. Part VI.
Horn's Geography. Parts 1 and 2.
Horn's Lessons in Grammar and Geography. Standard III.

Johnston, W. and A. K.—
Wall Map of England and Wales.

Longmans and Co.—
Rhetoric and Composition, Part II. By Alex. Bain, LL.D.
The Revised Latin Primer. By B. Hall Kennedy, D.D.
The Shorter Latin Primer. By B. Hall Kennedy, D.D.
The Standard of Value. By William Leighton Jordan.
Lessons in Elementary Mechanics. Stage 2. By W. H. Grieve.
A Treatise on Plane Trigonometry. By John Casey, LL.D., F.R.S.
Longmans' Commercial Mathematics.
Longmans' Test Cards in Mechanics. Stages 1, 2, and 3.

Macmillan and Co.—
Grimms' Kinder und Hausmärchen. By G. Eugène Fasnacht.
Elementary School Atlas. By J. Bartholomew, F.R.G.S.

Murby, Thomas—
Notabilia of Geography. By W. Blanchard.

Nelson, T., and Sons—
The Royal Standard Reader. Standard VI.: The Boy makes the Man.
Arithmetic Drill Sheets for Infants.

Smith, Elder and Co.—
The Cornhill Magazine. June.

Swan Sonnenschein and Co.—
British Reptiles and Batrachians. By Catherine C. Hopley.
The Cyclopædia of Education. Part V.
Girls' High School Series: Virgil's Æneid, Book I.
Hermann Paul's Principles of the History of Language. Translated by H. A. Strong, M.A., LL.D.

The Clarendon Press—

Johnson's Lives of the Poets: Milton. By C. H. Firth, M.A.
Xenophon, Cyropædia. Book I. By C. Bigg, D.D.
Xenophon, Anabasis. Book III. By T. Marshall, M.A.

The School Books Publishing Company—

An Elementary Treatise on Mensuration. By E. J. Henchie.

Trübner and Co.—

Sunlight.

Ward, Lock, and Co.—

Health in Schools and Workshops. By G. Black, M.B.

Waterlow and Sons—

Plotting; or, Graphic Mathematics. By Dr. R. Wormell.

Whittaker and Co.—

German Epic Tales: Die Nibelungen; Walther und Hildegund. Edited by C. Neuhaus.
Progressive German Reader. By Franz Lange.
Hey's Fabeln für Kinder. By Franz Lange.
———— With Phonetic Introduction.
Nature Reader. No. 1. By J. McNair Wright.

Williams and Norgate—

Eugène's French Grammar.
French Composition. By Leon Delbos, M.A.
Scenes from the war in La Vendée. With Notes by C. Scudamore, M.A.
Victor Hugo's Notre-Dame de Paris. Vols. 1 and 2. With Notes by J. Boïelle.
Cæsar. Book I. With Notes by A. M. Bell, M.A.

Query Column.

RULES.

1. Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

⁂ All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.*

General.

1. LEX.—There is the book you mention. It is not easy to procure. Write to the publisher and explain why you want it. Most likely a copy will be sent to you.

2. JOHN H. J.—Another article will appear on the subject you mention. If you have a teacher use Aue's 'German Grammar,' Chambers. If not, begin with 'German Principia,' Part I., and correct your exercises with the aid of the key.

3. LORD REVELFACH.—The back numbers and volumes of the PRACTICAL TEACHER contain just what you are asking for. From the first volume a large part of the magazine has been devoted to that subject. Try 'French Principia' and 'Latin Principia,' Murray; or Dr. Abbott's 'Via Latina,' Seeley; or Macmillan's 'Progressive French Course.' Have you seen Hughes's 'French and German Journal'? 3d. a month. French is likely to be most useful to you. We cannot say which are the best. For your purpose try Capel's 'Catch Questions in Arithmetic' together with some book like Colenso's or B. Smith's.

4. PRIVATE STUDENT.—You seem to have enough books. For the first part of your question see Prantl, page 198. For the second see Thomé's 'Botany' (Longman and Co.) page 136. There are appendages to two of the stamens of viola and these are the nectar glands you speak of. Don't trouble about what you think is coming. How can you tell? Do all your work moderately well and you will be sure to find something you can do.

5. ANXIOUS.—Yes, certainly.

6. HIGH SCHOOL.—We don't undertake to value as many as twenty specimens for one person. The best half dozen are No. 9, 8; No. 5, 8; No. 8, 7; No. 3, 7; No. 10, 6; No. 4, 6. Most of them are too small, and for all of them you need to practise good copies so as to learn what the shapes of the letters really are.

7. BACCHUS.—You will find the reason for the Rule for finding Cube Root in *Barnard Smith's* Arithmetic, *Capel's* Catch Questions in Arithmetic and Mensuration, *Todhunter's* Algebra, &c.

8. J.H.—For Euclid try Chambers' 'Euclid,' Casey's 'Euclid,' Todhunter's 'Euclid,' all good; the first and last would suit you best. For mensuration try Todhunter's 'Mensuration for beginners.' You really must be more definite. How can one recommend a book on Geography, or on History. Say exactly what you want to learn and how much you know already. Buy Philip's 'School Atlas,' or Johnstone's.

9. NOEL.—As to translation you need have no hesitation in putting the author's sentences in the best English at your command. There is no such thing as literal translation. What sometimes passes for it is not translation at all. It is often not English, and scarcely ever expresses in English what the author expressed in the language in which he was writing. Be sure your examiner understands both languages. When he asks you to explain a peculiar construction, do so, but do not under the name of a translation give him a list of the possible meanings of isolated words and phrases.

10. WELSHMAN.—The speed of a railway train increases uniformly for the first three minutes after starting, and during this times it travels 1 mile. What speed (in miles per hour) has it now gained, and what space did it describe in the first two minutes? (*Magnus.*)

Let f denote the acceleration in miles per hour, and t the time in hours;

$$\begin{aligned}\text{Then, space} &= \tfrac{1}{2} f t^2;\\ \therefore\ 1\text{ mile} &= \tfrac{1}{2} f \times (\tfrac{1}{20})^2\\ &= \tfrac{1}{2} f \times \tfrac{1}{400}\\ &= \tfrac{1}{800} f\\ \therefore\ f &= 800\text{ miles.}\\ \text{Velocity per hour} &= f t\\ &= 800\text{ miles} \times \tfrac{1}{20}\\ &= \underline{40\text{ miles.}}\ \text{Ans.}\\ S &= \tfrac{1}{2} f t^2;\end{aligned}$$

$$\begin{aligned}\therefore\ \text{Space described in 2 minutes} &= [\tfrac{1}{2} \times 800 \times (\tfrac{1}{30})^2]\text{ mile}\\ &= (400 \times \tfrac{1}{900})\text{ mile}\\ &= \underline{\tfrac{4}{9}\text{ mile.}}\ \text{Ans.}\end{aligned}$$

Note.—Please repeat the other question, and send the answer.

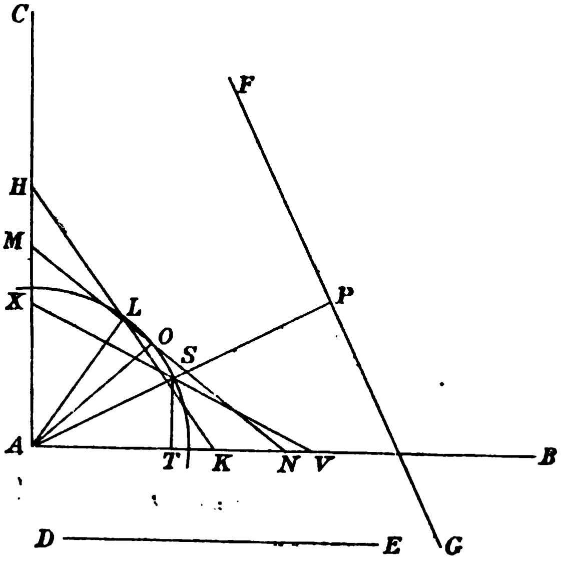
11. A P. T.—Huxley's 'Physiography' and Lawson's 'British Colonies,' Mackenzie's and Justin M'Carthy's 'History.' Todhunter or C. Smith's (larger books). Mansford's 'Mental Arithmetic.' Dunstan's 'Music Manual.' You will find all these books and some others you need on economy and arithmetic particularized in the query column of this magazine for the last year or two. You should read these replies. You would gain information and be saving yourself time and trouble. You may find difficulty in gaining admission for one year; two years is the usual course, but you could apply. Do so at once.

12. SCOTCHIE.—Macaulay's Essay on Lord Clive is not set for grammatical purposes. Read it, understand it, look out the allusions.

13. QUADRATIC.—As the answers given do not satisfy the equation, you have evidently copied it incorrectly. Will you please repeat it?

Geometry.

1. A. P. T.—A line of given length moves between two lines at right angles to each other, having one of its ends on each of them; find when its centre is at a minimum distance from a given line.



Let AB, AC be the straight lines at right angles.

Let DE be the given length, and FG the given line.

From AC cut off any length as AH less than DE.

From centre H and distance DE describe a circle cutting AB in K.

Bisect HK in L, and join AL.

Then because the angle HAK is a right angle, the circle described from centre L with radius LH or LK will pass through L.

Therefore AL = ½ HK or ½ DE.

Similarly if MN or any other line be drawn equal to DE, and bisected in O, then AO = ½ DE.

∴ Locus of middle points of all lines so placed is a circle whose centre is A and radius ½ DE.

Describe the circle, and draw AP at right angles to FG, cutting the circle in S.

Then S is the nearest point of circle to FG.

Draw ST perpendicular to AB.

Make TV = TA; join VS and produce it to meet AB in X.

Then XV is the line equal to DE, whose middle point S is nearest to FG.

For AV is bisected in T, and ST is parallel to AX.

Therefore XV is bisected in S.

And VS = AS = ½ DE.

Wherefore XV = DE.

Q. E. F.

Algebra.

1. B'HAM.—Solve:—

$$x^4 - 2x^3 + x = 380. \quad (\textit{Hall and Knight.})$$

$$x^4 - 2x^3 + x = 380$$

$$x^4 - 2x^3 + x^2 - x^2 + x = 380$$

$$(x^2 - x)^2 - (x^2 - x) = 380$$

$$(x^2 - x)^2 - (x^2 - x) + (\tfrac{1}{2})^2 = 380 + \tfrac{1}{4}$$

$$= \tfrac{1521}{4}$$

$$(x^2 - x) - \tfrac{1}{2} = \pm \tfrac{39}{2}$$

$$x^2 - x = \pm \tfrac{39}{2} + \tfrac{1}{2}$$

$$= 20, \text{ or } - 19$$

$$x^2 - x + (\tfrac{1}{2})^2 = 20 + \tfrac{1}{4}, \text{ or } - 19 + \tfrac{1}{4}$$

$$= \tfrac{81}{4}, \text{ or } - \tfrac{75}{4}$$

$$x - \tfrac{1}{2} = \pm \tfrac{9}{2}, \text{ or } \pm \frac{\sqrt{-75}}{2}$$

$$\therefore x = \pm \tfrac{9}{2} + \tfrac{1}{2}, \text{ or } \pm \frac{\sqrt{-75}}{2} + \tfrac{1}{2}$$

$$= 5, -4, \text{ or } \frac{1 \pm \sqrt{-75}}{2}.$$

2. E. N.—Solve:—

$$\frac{1}{x-6} + \frac{2}{x-3} - \frac{1}{x} = \tfrac{4}{7}.$$

(*Preliminary Examination, Chartered Accountants*, 1883.)

$$\frac{1}{x-6} + \frac{2}{x-3} - \frac{1}{x} = \tfrac{4}{7}$$

$$\frac{1}{x-6} - \frac{1}{x} = \tfrac{4}{7} - \frac{2}{x-3}$$

$$\frac{x - x + 6}{x^2 - 6x} = \frac{4x - 12 - 14}{7x - 21}$$

$$\frac{6}{x^2 - 6x} = \frac{4x - 26}{7x - 21}$$

$$3(7x - 21) = (2x - 13)(x^2 - 6x)$$

$$21x - 63 = 2x^3 - 25x^2 + 78x$$

$$2x^3 - 25x^2 + 57x + 63 = 0;$$

Assume $x = z + \tfrac{25}{6}]$

$$\therefore 2(z + \tfrac{25}{6})^3 - 25(z + \tfrac{25}{6})^2 + 57(z + \tfrac{25}{6}) + 63 = 0$$

$$2(z^3 + \tfrac{25}{2}z^2 + \tfrac{625}{12}z + \tfrac{15625}{216}) - 25(z^2 + \tfrac{25}{3}z + \tfrac{625}{36}) + 57z + \tfrac{1425}{6} + 63 = 0$$

$$2z^3 + 25z^2 + \tfrac{625}{6}z + \tfrac{15625}{108} - 25z^2 - \tfrac{625}{3}z - \tfrac{15625}{36} + 57z + \tfrac{1425}{6} + 63 = 0$$

$$2z^3 - \tfrac{283}{6}z - \tfrac{12223}{54} = 0$$

$$z^3 - \tfrac{283}{12}z - \tfrac{12223}{108} = 0;$$

In the cubic equation

$$z^3 + qz + r = 0,$$

$$z = \left(-\frac{r}{2} + \sqrt{\frac{r^2}{4} + \frac{q^3}{27}}\right)^{\frac{1}{3}} + \left(-\frac{r}{2} - \sqrt{\frac{r^2}{4} + \frac{q^3}{27}}\right)^{\frac{1}{3}};$$

In the given equation

$$q = -\tfrac{283}{12} \text{ and } r = -\tfrac{12223}{108};$$

$$\therefore z = \left(\tfrac{12223}{216} + \sqrt{\tfrac{149401729}{46656} - \tfrac{80089}{46656}}\right)^{\frac{1}{3}} + \left(\tfrac{12223}{216} - \sqrt{\frac{149401729 - 80089}{46656}}\right)^{\frac{1}{3}}$$

$$= \left(\tfrac{12223}{216} + \sqrt{\tfrac{149321640}{46656}}\right)^{\frac{1}{3}} + \left(\tfrac{12223}{216} - \frac{\sqrt{149321640}}{216}\right)^{\frac{1}{3}}$$

$$= \frac{(12223 + \sqrt{149321640})^{\frac{1}{3}}}{6} + \frac{(12223 - \sqrt{149321640})^{\frac{1}{3}}}{6};$$

$$\therefore x = \tfrac{1}{6}\left[25 + (12223 + \sqrt{149321640})^{\frac{1}{3}} + (12223 - \sqrt{149321640})^{\frac{1}{3}}\right].$$

3. ALGEBRA.—A certain number of plums was bought for a shilling. If each plum had been a half-penny dearer, the number of plums in a shilling's worth would have been diminished by two. How many were bought at first?

Let x = Number of plums for a shilling,

Then $\frac{24}{x}$ = Price of each plum in halfpence;

$$\therefore\ x - 2 = 24 \div \left(\frac{24}{x} + 1\right)$$
$$= 24 \div \frac{24 + x}{x}$$
$$= 24 \times \frac{x}{x + 24}$$
$$(x - 2)(x + 24) = 24x$$
$$x^2 + 22x - 48 = 24x$$
$$x^2 + 22x - 24x = 48$$
$$x^2 - 2x = 48$$
$$x^2 - 2x + 1 = 49$$
$$x - 1 = \pm 7$$
$$\therefore\ x = \pm 7 + 1$$
$$= 8, \text{ or } -6.$$

$\therefore$ Number of plums bought at first for a shilling = $\underline{8}$. Ans.

4. B'HAM.—Solve :—

$$27x^3 + 21x + 8 = 0. \quad \textit{(Hall and Knight.)}$$
$$27x^3 + 21x + 8 = 0$$
$$27x^3 + 1 + 21x + 7 = 0$$
$$27\left(x^3 + \tfrac{1}{27}\right) + 21\left(x + \tfrac{1}{3}\right) = 0$$

Dividing by $(x + \frac{1}{3})$]

$$27\left(x^2 - \frac{x}{3} + \tfrac{1}{9}\right) + 21 = 0$$
$$x^2 - \frac{x}{3} + \tfrac{1}{9} + \tfrac{7}{9} = 0$$
$$x^2 - \frac{x}{3} = -\tfrac{8}{9}$$
$$x^2 - \frac{x}{3} + \left(\tfrac{1}{6}\right)^2 = -\tfrac{8}{9} + \tfrac{1}{36}$$
$$= -\tfrac{31}{36}$$
$$x - \tfrac{1}{6} = \pm \frac{\sqrt{-31}}{6}$$
$$\therefore\ x = \frac{1 \pm \sqrt{-31}}{6}.$$

As we divided by $(x + \frac{1}{3})$,
We can put $x + \frac{1}{3} = 0$

$$\therefore\ x = -\tfrac{1}{3}.$$
$$\therefore\ x = -\tfrac{1}{3}, \text{ or } \frac{1 \pm \sqrt{-31}}{6}.$$

5. BURTON.—Prove—

$$\text{Log}_e (x + 1) = \frac{4x}{2x + 1} \log_e x - \frac{2x - 1}{2x + 1} \log_e (x - 1)$$
$$- \frac{2}{2x + 1}\left[\frac{1}{2.3.x^3} + \frac{2}{3.5.x^5} + \frac{3}{4.7.x^7} + \dots\right]$$

(Todhunter.)

We have to prove that

$$\text{Log}_e (x + 1) - \frac{4x}{2x + 1} \log_e x + \frac{2x - 1}{2x + 1} \log_e (x - 1)$$
$$= - \frac{2}{2x + 1}\left[\frac{1}{2.3.x^3} + \frac{2}{3.5.x^5} + \frac{3}{4.7.x^7} + \dots\right]$$

$$\text{Log}_e (x + 1) - \frac{4x}{2x + 1} \log_e x + \frac{2x - 1}{2x + 1} \log_e (x - 1)$$
$$= \log_e \left[\left(1 + \frac{1}{x}\right) \times x\right] - \frac{4x}{2x + 1} \log_e x$$
$$+ \frac{2x - 1}{2x + 1} \log_e \left[\left(1 - \frac{1}{x}\right) \times x\right]$$
$$= \log_e \left(1 + \frac{1}{x}\right) + \log_e x - \frac{4x}{2x + 1} \log_e x$$
$$+ \frac{2x - 1}{2x + 1} \log_e \left(1 - \frac{1}{x}\right) + \frac{2x - 1}{2x + 1} \log_e x$$
$$= \log_e \left(1 + \frac{1}{x}\right) + \frac{2x - 1}{2x + 1} \log_e \left(1 - \frac{1}{x}\right)$$
$$+ \left(1 - \frac{4x}{2x + 1} + \frac{2x - 1}{2x + 1}\right) \log_e x$$
$$= \log_e \left(1 + \frac{1}{x}\right) + \frac{2x - 1}{2x + 1} \log_e \left(1 - \frac{1}{x}\right)$$
$$= \log_e \left(1 + \frac{1}{x}\right) + \frac{2x}{2x + 1} \log_e \left(1 - \frac{1}{x}\right)$$
$$- \frac{1}{2x + 1} \log_e \left(1 - \frac{1}{x}\right)$$
$$= \log_e \left(1 + \frac{1}{x}\right) + \frac{2x}{2x + 1} \log_e \left[\left(1 - \frac{1}{x^2}\right) \div \left(1 + \frac{1}{x}\right)\right]$$
$$- \frac{1}{2x + 1} \log_e \left(1 - \frac{1}{x}\right)$$
$$= \log_e \left(1 + \frac{1}{x}\right) + \frac{2x}{2x + 1} \log_e \left(1 - \frac{1}{x^2}\right)$$
$$- \frac{2x}{2x + 1} \log_e \left(1 + \frac{1}{x}\right) - \frac{1}{2x + 1} \log_e \left(1 - \frac{1}{x}\right)$$
$$= \frac{2x}{2x + 1} \log_e \left(1 - \frac{1}{x^2}\right) + \left(1 - \frac{2x}{2x + 1}\right) \log_e \left(1 + \frac{1}{x}\right)$$
$$- \frac{1}{2x + 1} \log_e \left(1 - \frac{1}{x}\right)$$
$$= \frac{2x}{2x + 1} \log_e \left(1 - \frac{1}{x^2}\right) + \frac{1}{2x + 1} \log_e \left(1 + \frac{1}{x}\right)$$
$$- \frac{1}{2x + 1} \log_e \left(1 - \frac{1}{x}\right)$$
$$= \frac{2x}{2x + 1} \log_e \left(1 - \frac{1}{x^2}\right) + \frac{1}{2x + 1} \log_e \frac{1 + \frac{1}{x}}{1 - \frac{1}{x}}$$
$$= \frac{2}{2x + 1} \left\{x \log_e \left(1 - \frac{1}{x^2}\right) + \tfrac{1}{2} \log_e \frac{1 + \frac{1}{x}}{1 - \frac{1}{x}}\right\};$$

Now, $\log_e \left(1 + \frac{1}{x}\right) = \frac{1}{x} - \frac{1}{2x^2} + \frac{1}{3x^3} - \frac{1}{4x^4} + \dots$

$$\log_e \left(1 - \frac{1}{x}\right) = -\frac{1}{x} - \frac{1}{2x^2} - \frac{1}{3x^3} - \frac{1}{4x^4} - \dots$$
$$\therefore\ \log_e \left(1 + \frac{1}{x}\right) + \log_e \left(1 - \frac{1}{x}\right), \text{ or } \log_e \left(1 - \frac{1}{x^2}\right)$$
$$= -\frac{1}{x^2} - \frac{1}{2x^4} - \frac{1}{3x^6} - \frac{1}{4x^8} - \dots$$

And $\log_e \frac{1 + \frac{1}{x}}{1 - \frac{1}{x}}$

$$= 2\left(\frac{1}{x} + \frac{1}{3x^3} + \frac{1}{5x^5} + \frac{1}{7x^7} + \dots\right)$$
$$\therefore\ \frac{2}{2x + 1} \left\{x \log_e \left(1 - \frac{1}{x^2}\right) + \tfrac{1}{2} \log_e \frac{1 + \frac{1}{x}}{1 - \frac{1}{x}}\right\}$$
$$= \frac{2}{2x + 1}\left[x\left(-\frac{1}{x^2} - \frac{1}{2x^4} - \frac{1}{3x^6} - \frac{1}{4x^8} - \dots\right)\right.$$
$$\left. + \tfrac{1}{2} \text{ of } 2\left(\frac{1}{x} + \frac{1}{3x^3} + \frac{1}{5x^5} + \frac{1}{7x^7} + \dots\right)\right]$$
$$= \frac{2}{2x + 1}\left[-\frac{1}{x} - \frac{1}{2x^3} - \frac{1}{3x^5} - \frac{1}{4x^7} - \dots\right.$$
$$\left. + \frac{1}{x} + \frac{1}{3x^3} + \frac{1}{5x^5} + \frac{1}{7x^7} + \dots\right]$$
$$= \frac{2}{2x + 1}\left[-\left(\frac{1}{2x^3} - \frac{1}{3x^3}\right) - \left(\frac{1}{3x^5} - \frac{1}{5x^5}\right)\right.$$
$$\left. - \left(\frac{1}{4x^7} - \frac{1}{7x^7}\right) - \dots\right]$$
$$= - \frac{2}{2x + 1}\left[\frac{1}{2.3.x^3} + \frac{2}{3.5.x^5} + \frac{3}{4.7.x^7} + \dots\right]$$

Q. E. D.

6. CAN'K.—If $\phi(n)$ be the sum of n terms of an A. P., find $\phi(n)$ in terms of n and the first two terms.

Also show that

$$\phi(n+3) - 3\phi(n+2) + 3\phi(n+1) - \phi(n) = 0.$$

(Todhunter.)

If a represent the first term, and d the difference,

Then, $\phi(n) = [2a + (n-1)\text{d}.]\ \frac{n}{2}$

Let b denote the second term,

Then, $b = a + d$, and $d = b - a$;

$$\therefore\ \phi(n) = [2a + (n-1)(b-a)]\ \frac{n}{2}$$

$$= [2a + n(b-a) - b + a]\ \frac{n}{2}$$

$$= [n(b-a) + 3a - b]\ \frac{n}{2}$$

$$= \frac{n^2(b-a)}{2} + \frac{n(3a-b)}{2}.$$

Hence :—

$$\phi(n+3) - 3\phi(n+2) + 3\phi(n+1) - \phi(n)$$

$$= \frac{b-a}{2}[(n+3)^2 - 3(n+2)^2 + 3(n+1)^2 - n^2]$$

$$+ \frac{3a-b}{2}[n + 3 - 3(n+2) + 3(n+1) - n]$$

$$= \frac{b-a}{2}[n^2 + 6n + 9 - 3(n^2 + 4n + 4)$$

$$+ 3(n^2 + 2n + 1) - n^2]$$

$$+ \frac{3a-b}{2}[3 - 3n - 6 + 3n + 3]$$

$$= \frac{b-a}{2}[6n + 9 - 3n^2 - 12n - 12 + 3n^2$$

$$+ 6n + 3] + \left(\frac{3a-b}{2} \times 0\right)$$

$$= \frac{b-a}{2} \times 0$$

$= \underline{0.}$ Ans.

7. FRANK.—Sum to n terms

$$\left(r - \frac{1}{r}\right)^2 + \left(r^2 - \frac{1}{r^2}\right)^2 + \left(r^3 - \frac{1}{r^3}\right)^2 + \ldots\ldots$$

(Todhunter.)

$$\left(r - \frac{1}{r}\right)^2 + \left(r^2 - \frac{1}{r^2}\right)^2 + \left(r^3 - \frac{1}{r^3}\right)^2 + \ldots\ldots$$

to n terms

$$= \left(r^2 - 2 + \frac{1}{r^2}\right) + \left(r^4 - 2 + \frac{1}{r^4}\right) + \left(r^6 - 2 + \frac{1}{r^6}\right) + \ldots\ldots$$

to n terms

$$= (r^2 + r^4 + r^6 + \ldots\ldots r^{2n}) + \left(\frac{1}{r^2} + \frac{1}{r^4} + \frac{1}{r^6} + \ldots\ldots\right.$$

$$\left. + \frac{1}{r^{2n}}\right) - 2n$$

$$= \frac{r^2(r^{2n}-1)}{r^2-1} + \frac{\frac{1}{r^2}\left(\frac{1}{r^{2n}} - 1\right)}{\frac{1}{r^2} - 1} - 2n$$

(Sum of two geometrical progressions)

$$= \frac{r^2(r^{2n}-1)}{r^2-1} + \frac{\frac{1}{r^2}\left(\frac{1-r^{2n}}{r^{2n}}\right)}{\frac{1}{r^2}(1-r^2)} - 2n$$

$$= \frac{r^2(r^{2n}-1)}{r^2-1} + \frac{r^{2n}-1}{r^{2n}(r^2-1)} - 2n$$

$$= \frac{r^{2n}-1}{r^2-1}\left(r^2 + \frac{1}{r^{2n}}\right) - 2n. \quad \text{Ans.}$$

8. CYCLOPS.—Solve the equation :—

$$\left.\begin{aligned} x^2yz &= a \\ xy^2z &= b \\ xyz^2 &= c \end{aligned}\right\}\textit{(Jones and Cheyne.)}$$

$$\left.\begin{aligned} (1)\ x^2yz &= a \\ (2)\ xy^2z &= b \\ (3)\ xyz^2 &= c \end{aligned}\right\}$$

Multiplying all together] $x^4y^4z^4 = abc$

$$\therefore\ xyz = \pm \sqrt[4]{abc}.$$

$$(1)\quad x^2yz = a$$

$$\frac{x^2yz}{xyz} = \frac{a}{\pm\sqrt[4]{abc}}$$

$$\therefore\ x = \pm\frac{a}{\sqrt[4]{abc}}.$$

$$(2)\quad xy^2z = b$$

$$\frac{xy^2z}{xyz} = \frac{b}{\pm\sqrt[4]{abc}}$$

$$\therefore\ y = \pm\frac{b}{\sqrt[4]{abc}}.$$

$$(3)\quad xyz^2 = c$$

$$\frac{xyz^2}{xyz} = \frac{c}{\pm\sqrt[4]{abc}}$$

$$\therefore\ z = \pm\frac{c}{\sqrt[4]{abc}}.$$

Arithmetic.

1. NITOR.—A vat contains 900 gallons of methylated spirits to which 9 % too little naphtha has been added; how much naphtha must be added to bring the mixture to the legal standard, which is 10 % of naphtha?

Quantity of naphtha that ought to have been added at first
= 10 % of 900 gals.
= 90 gals.;

Quantity of naphtha that was added $= \frac{100-9}{100}$ of 90 gals.
$= \frac{91}{100}$ of 90 gals.
$= \frac{819}{10}$ gals.;

$\therefore\ (100 - 10)$ gals. : $(900 - \frac{819}{10})$ gals. :: 10 gals. : Total quantity of naphtha.

90 gals. : $\frac{8181}{10}$ gals. :: 10 gals. : Total quantity.
$= \frac{8181}{90}$ gals.
$= \frac{909}{10}$ gals.

$\therefore$ Quantity of naphtha to be added $= (\frac{909}{10} - \frac{819}{10})$ gals.
$= \frac{90}{10}$ gals.
$= \underline{9\ \text{gals.}}$ Ans.

2. FOLKESTONIAN.—A field is 25 miles round. Three men start travelling round and round it.

A goes 10 miles per hour,
B „ $33\frac{1}{3}$ „ „ ,
C „ $13\frac{1}{3}$ „ „ .

Find least number of hours when they will be together at the starting point.

Time for A to travel round $= \frac{25}{10}$ hrs. $= \frac{5}{2}$ hrs.,
„ B „ „ $= \frac{25}{33\frac{1}{3}}$ hrs. $= \frac{75}{100}$ hr.,
$= \frac{3}{4}$ hr.,
„ C „ „ $= \frac{25}{13\frac{1}{3}}$ hrs.
$= \frac{75}{40}$ hrs.
$= \frac{15}{8}$ hrs.;

Times $= (\frac{5}{2}, \frac{3}{4}, \frac{15}{8})$ hrs. respectively.

$$\left.\begin{aligned} &\text{L. C. M. of Numerators} = 15 \\ &\text{G. C. M. of Denominators} = 2 \end{aligned}\right\}$$

$\therefore$ Time $= \frac{15}{2}$ hrs.
$= \underline{7\frac{1}{2}\ \text{hrs.}}$ Ans.

3. SEX.—A, B, and C start together to walk round a circular course 280 yards in circumference; their rates of walking are 4, 5, and 6 miles respectively per hour; after what time will they all be together again at the starting point, and how many rounds will each have then made? (*Certificate*, 1882.)

Time for A to walk a round $= \dfrac{\overset{7}{\cancel{280}}}{\cancel{4}\times 176\cancel{0}}$ hr.

$= \dfrac{7\times\overset{15}{\cancel{60}}}{\underset{44}{\cancel{176}}}$ min.

$= \frac{105}{44}$ min.,

" B " " $= \dfrac{\overset{7}{\cancel{280}}}{5\times\underset{44}{\cancel{1760}}}$ hr.

$= \dfrac{7\times\overset{12}{\cancel{60}}}{\cancel{5}\times 44}$ min.

$= \frac{84}{44}$ min.,

" C " " $= \dfrac{\overset{7}{\cancel{280}}}{6\times\underset{44}{\cancel{1760}}}$ hr.

$= \dfrac{7\times\overset{10}{\cancel{60}}}{\cancel{6}\times 44}$ min.

$= \frac{70}{44}$ min.;

Times $= \dfrac{105,\ 84,\ 70}{44}$ min. respectively.

L. C. M. of 105, 84, 70 = 420;

∴ They are all together at the starting point in $\frac{420}{44}$ min.

$= \frac{105}{11}$ min.

$= 9\frac{6}{11}$ min.

$$\left.\begin{array}{l}\text{No. of rounds made by A} = 420 \div 105 = 4\\ \quad\text{"}\qquad\quad\text{"}\qquad\quad \text{B} = 420 \div 84 = 5\\ \quad\text{"}\qquad\quad\text{"}\qquad\quad \text{C} = 420 + 70 = 6\end{array}\right\}$$

4. CECILIA.—A woman sold $7\frac{1}{2}$ dozen oranges for 6s. 2d., some at the rate of 3 for $2\frac{1}{2}$d., and the rest at 8 for $6\frac{1}{2}$d. Required the number sold at each rate. (*Kingston* 'Test Cards.')

Average selling price $= \dfrac{\text{6s. 2d.}}{7\frac{1}{2}\text{ doz.}}$

$= \frac{74}{90}$d.

$= \frac{37}{45}$d.;

Selling price of each of 1st lot $= \dfrac{2\frac{1}{2}\text{d.}}{3}$

$= \frac{5}{6}$d.;

" " " 2nd " $= \dfrac{6\frac{1}{2}\text{d.}}{8}$

$= \frac{13}{16}$d.;

Difference between average price and price of 1st lot

$= (\frac{5}{6} - \frac{37}{45})$d.

$= \dfrac{75 - 74}{90}$d.

$= \frac{1}{90}$d.;

Difference between average price and price of 2nd lot

$= (\frac{37}{45} - \frac{13}{16})$d.

$= \dfrac{592 - 585}{720}$d.

$= \frac{7}{720}$d.;

∴ No. in 1st lot : No. in 2nd lot :: $\frac{7}{720}$: $\frac{1}{90}$

:: 7 : 8;

∴ No. in 1st lot $= \dfrac{7}{7+8}$ of $7\frac{1}{2}$ dozen

$= \frac{7}{15}$ of 90

= 42;

" " 2nd " = 90 − 42

= 48.

5. LEARNER.—A man owes a debt of £1,430 due 2 years hence; he invests a certain sum in the 3 per cents. at 73, and at the end of the first year he invests a like sum and also the interest on the first sum in the same funds, which have risen to 76. At the end of the second year he sells out at $79\frac{1}{2}$, and with the interest realizes just enough to pay his debt. Find the sum invested. (*Marlbro'* Arithmetic.)

Income first year on an investment of £73 = £3;

Income second year on that and a further investment of £73 and the interest £3, or £76 = £6;

Amount received for these investments on selling out

$= £79\frac{1}{2} \times 2$

= £159;

Amount received with interest = £159 + £6

= £165;

$$\therefore\ \overset{£}{\underset{3}{\cancel{165}}}\ :\ \overset{£}{\underset{26}{\cancel{1430}}}\ ::\ \overset{£}{73}\ :\ \text{Sum invested each year.}$$

26

73

3 | 1898

£632 13s. 4d. Ans.

6. ASSISTANT MASTER.—A person bought a French watch, bearing a duty of 25 per cent., and sold it at a loss of 5 per cent.; had he sold it for £3 more he would have cleared 1 per cent. on his bargain. What had the French maker for it?

Suppose the watch cost £100,

Then cost with duty = £125;

Loss = 5 °/。 on £125 = £6 5s.,

Gain = 1 °/。 " " = £1 5s.,

Difference between the two prices = £6 5s. + £1 5s.

= £7 10s.;

∴ Cost of watch $= £100 \times \dfrac{3}{7\frac{1}{2}}$

$= £100 \times \frac{2}{5}$

= £40. Ans.

Trigonometry.

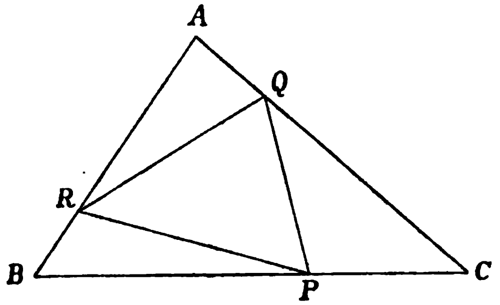
1. THIRD STAGE.—P, Q, R are points in the sides BC, CA, and AB respectively of a triangle, such that

$$\frac{BP}{BC} = \frac{CQ}{CA} = \frac{AR}{AB} = x;$$

show that

$$PQ^2 + QR^2 + RP^2 = (a^2 + b^2 + c^2)(1 - 3x + 3x^2).$$

(*Todhunter's 'Trigonometry for Beginners.'*)



$$\frac{BP}{BC} = \frac{CQ}{CA} = \frac{AR}{AB} = x,$$

$$\frac{BP}{a} = \frac{CQ}{b} = \frac{AR}{c} = x,$$

$$\therefore\ BP = ax,\ CQ = bx,\ AR = cx.$$

$$\left.\begin{array}{l}PQ^2 = PC^2 + CQ^2 - 2PC.CQ\cos C\\ QR^2 = QA^2 + AR^2 - 2QA.AR\cos A\\ RP^2 = RB^2 + BP^2 - 2RB.BP\cos B\end{array}\right\}$$

$$\begin{aligned}
\therefore\ & PQ^2 + QR^2 + RP^2 \\
&= (a - ax)^2 + (bx)^2 - 2bx\,(a - ax)\cos C \\
&\quad + (b - bx)^2 + (cx)^2 - 2cx\,(b - bx)\cos A \\
&\quad + (c - cx)^2 + (ax)^2 - 2ax\,(c - cx)\cos B \\
&= a^2 - 2a^2x + a^2x^2 + b^2x^2 - 2abx\,(1 - x)\cos C \\
&\quad + b^2 - 2b^2x + b^2x^2 + c^2x^2 - 2bcx\,(1 - x)\cos A \\
&\quad + c^2 - 2c^2x + c^2x^2 + a^2x^2 - 2acx\,(1 - x)\cos B \\
&= a^2 + b^2 + c^2 - 2a^2x - 2b^2x - 2c^2x + 2a^2x^2 + 2b^2x^2 + 2c^2x^2 \\
&\quad - 2bcx\,(1 - x)\cos A - 2acx\,(1 - x)\cos B \\
&\qquad\qquad\qquad - 2abx\,(1 - x)\cos C \\
&= (a^2 + b^2 + c^2) - 2x\,(a^2 + b^2 + c^2) + 2x^2(a^2 + b^2 + c^2) \\
&\quad - 2x\,(1 - x)\,[bc\cos A + ac\cos B + ab\cos C] \\
&= (a^2 + b^2 + c^2)\,(1 - 2x + 2x^2) \\
&\quad - 2x\,(1 - x\left\{bc \times \frac{b^2 + c^2 - a^2}{2bc} + ac \times \frac{a^2 + c^2 - b^2}{2ac}\right. \\
&\qquad\qquad\qquad \left. + ab \times \frac{a^2 + b^2 - c^2}{2ab}\right\} \\
&= (a^2 + b^2 + c^2)\,(1 - 2x + 2x^2) \\
&\quad - x\,(1 - x)\,[b^2 + c^2 - a^2 + a^2 + c^2 - b^2 + a^2 + b^2 - c^2] \\
&= (a^2 + b^2 + c^2)\,(1 - 2x + 2x^2) - (x - x^2)\,(a^2 + b^2 + c^2) \\
&= (a^2 + b^2 + c^2)\,(1 - 3x + 3x^2).
\end{aligned}$$

——o——

How a Scotch School was Examined.

THE first day was devoted to the examination of Infants. Standards I. and II. and the written work—writing and arithmetic of Standards IV., V. and VI.

H. M. Inspector, after examining the school offices, found the children of III., IV., V., and VI. seated in the main room ready for their music lesson. Standard I. in a centre class-room and the Infants in their own room. After overhauling log book he asked for a list of songs. While one chosen by him was being sung the second master was setting an exercise in four pulse measure on the black board in one part; but when he heard the children do a modulator voluntary and a number of ear exercises on the school harmonium he requested a second part to be added. Questions on the number of pulses, &c., were allowed and the treble and alto permitted to try their parts over before singing them together. Standards II. and III. were asked to sing by themselves, and also tried with ear exercises given step-wise on the harmonium. Standard I. sang a song, and did some singing, at sight and by hand signs. The Infants sang from modulator, hand signs, and were asked for two action songs.

Modulator Exercise :—**d m s m r f t l d' l f m fe s d' ta l t d' m d' s m d t, l,** — **l, t, d r m bah se l l s f m r d t, l,** &c. Ear Exercise for IV., V., VI.—**d m r f** ; **s m d t,** ; **r f l s** ; **s fe l s** ; Inspector asked **d' r' t d'** and another. Standards II. and III. sang from modulator and did such ear exercises as **m f s**, **r m f**, **d' t l**, **s f m**.

Every child in the Infant Classes had to read and spell, and answer on meanings of words, animals, &c. Mental Arithmetic was given, and strict attention paid that fingers were not used in either adding or subtracting. A certain number of capital and small letters was taken from all; even those who had but just made their attendances were expected to have mastered the most, if not all, of the small letters.

The Infant Mistress was asked to give a lesson on 'Colour,' 'A lesson in Arithmetic,' and the Inspector asked for one of a list of 12 Object Lessons gone over during the year, the one selected being 'A Railway Station.'

Returning to the senior class-room, Standards IV., V., and VI., were seated in such a manner as to make copying impossible, and, provided with foolscap, ink, and pens, were ready for action. Standard VI. got an essay to write on 'The game I like best,' and V. were asked to give an abstract of the story of 'Napoleon and the English Sailor,' which was narrated by the Inspector.

While the higher Standards were doing their written work Standards I. and II. were examined in reading, writing and arithmetic. The boys read from the one set and the girls from the other. In Standard II. questions were asked on the subject matter to test the intelligence; and verbs, nouns, adjectives were to be found.

Writing:—Standard I. wrote a line from their books, every alternate pupil taking a different line from his neighbour. Standard II.—'A famous doctor came to the court of an eastern prince. On his arrival, he asked, "How do you manage to live here?" "We do not eat" was the reply.'

Arithmetic for Standard I. read in words—

1. 648 + 701 + 34 + 890 + 215. 2,488. Ans.
2. 846 + 642 + 986 + 475 + 348. 3,297. Ans.
3. 831 − 609. 222. Ans.

STANDARD II.

The children were placed back-to-back on the floor and all got the same sums.

1. 7,165 + 9,760 + 4,584 + 6,872 + 4,815 + 9,186 + 783. 43,165. Ans.
2. 70,963 − 9,184. 61,779. Ans.
3. 785,402 × 6. 4,712,412. Ans.

STANDARD III.

'A simple way to catch eels is by using a corn-sack in the following manner. Turn down a hem, and run a line round the mouth; drop a sheep's paunch into the sack, and fill up the vacant space with straw, packing it as tight as possible; then sink your sack in the pond or river.'

STANDARD IV.

'So the news was spread over the whole island that the Rajah must go to meet the great spirit on the top of the mountain; and every village sent forth its men, and they cleared away the jungle and made bridges over the mountain streams and smoothed the rough places for the Rajah's passage. And when they came to the steep and craggy rocks of the mountain, they sought out the best paths, sometimes along the bed of a torrent.'

The following are specimens of the Arithmetic cards distributed. The sums were to be worked and put on paper within the hour.

STANDARD III.

1. Multiply sixty thousand five hundred and forty one by four hundred and eighty two.

29,180,762. Ans.

2. Divide eight hundred and four thousand and sixty nine by sixty three (factors).

12,763. Ans.

3. 1,459,803 ÷ 376. $3,882\frac{171}{376}$. Ans.

4. From £250 0s. 5d. take £39 10s. $10\frac{1}{2}$d.

£210 9s. $6\frac{1}{2}$d. Ans.

STANDARD IV.

1. £890 17s. $1\frac{3}{4}$d. × 273.

£243,204 0s. $9\frac{3}{4}$d. Ans.

2. Reduce 97,305 stones to tons.

608 tons 3 cwt. 1 stone. Ans.

3. Reduce fifteen thousand and nine half crowns to half-pence.

900,540 half-pence. Ans.

4. How many minutes in 6 weeks 3 hours?

60,660 min. Ans.

STANDARD V.

1. Find by practice the cost of 4,711 articles at £2 13s. $8\frac{1}{4}$d. each.

£12,646 1s. $9\frac{3}{4}$d. Ans.

2. Make out the following bill:—

1 box of cod, 176 lbs., at $2\frac{1}{2}$d. per lb.
4 salmon, each $48\frac{1}{2}$ lbs., at $10\frac{1}{2}$d. per lb.
5 boxes of whelks, weighing altogether $4\frac{1}{2}$ cwt., at $\frac{1}{2}$d. per lb.
9 lobsters at 4s. 3d. each.

£1 16s. 8d. + £8 9s. 9d. + £1 1s. + £1 18s. 3d. = £13 5s. 8d. Ans.

3. From the sum of $\frac{1}{4}$, $\frac{1}{6}$, and $\frac{1}{8}$, take $\frac{1}{8}$ of $\frac{3}{4}$.

$\frac{7}{24}$. Ans.

4. What is the rent of 150 ac. 15 pls. when 6 ac. 3 rds. 18 pls. are let for £42 19s. 6d.?

£939 18s. $7\frac{32}{61}$d. Ans.

STANDARD VI.

1. Find the value of $\frac{3}{13}$ of 6s. 6d. + $\frac{11}{19}$ of £1 18s. − $5\frac{4}{11}$ of 2s. 9d.

8s. 9d. Ans.

2. What sum of money will produce 13s. 6d. as interest in 5 months at $4\frac{1}{2}$ per cent.?

£36. Ans.

3. In a school the fees amount to £3 14s. 8d. in a week; 100 scholars pay 3d. and the rest 2d. How many scholars were there?

198. Ans.

4. If 72 men build a wall 140 yds. long and 6 ft. high in 14 days, in how many days will 112 men build a wall 80 yds. long and 7 ft. high?

6 days. Ans.

In Standards III.—VI. every child read. If they managed to speak in an easy, natural manner, they passed at once. Any child hesitating in attacking a passage was asked to try his strength in another part of the book. After the reading was over, the pupils were tested as to intelligence and general knowledge. Parsing and analysis were taken from the reading book and not confined to the bare requirements given in code. Sentence-making was exacted from IV., V., and VI.

STANDARD III.

Repetition.—Wordsworth's 'Pet Lamb.' Irregular testing of individual children, one verse each, and also children required to finish a verse after the naming of one or two words at the beginning. Careful meaning of phrases and single words.

STANDARD IV.

Thomson's 'Seasons,' beginning at 'Now, when the first foul torrent of the brooks. Meaning as in Standard III. with sentence-making.

STANDARD V.

'Saxon and Gael.'—Particular attention to suiting the action to the word. Meaning and sentence-making.

STANDARD VI.

Trial scene from 'The Merchant of Venice.' Several children selected to act the parts. Teacher asked to put some questions.

In Geography and History, Standard III. read from a Historical Reader and answered questions on the physical features of Scotland and gave instances of mountains, capes, rivers, &c., defining the meaning of these terms in words. One pupil teacher was asked to give an oral lesson on the life of Bruce, and another examined the Standard on the rivers of Scotland.

STANDARD IV.

Had to tell very minutely the Geography of the south and west coasts of England and also that of Ireland, the whole requiring a familiar acquaintance with the map. The teacher of the class then examined it on the history of Charles II. and the Inspector continued the examination himself till the end of Queen Anne's reign, omitting no important item.

STANDARD V.

Meanwhile had been drawing their favourite map, and were thoroughly tested first on the Geography of the Baltic, the Atlantic, and the Mediterranean, and then on Canada and New Zealand. The whole of their History passed under review.

STANDARD VI.

Drew a map of India and were asked the physical features of America, Asia, and Africa, the occupations and productions of Canada, interchange of products, and causes influencing climate. In History, the wars and constitutional changes in the present reign were the chief items of examination.

NOTE.—For the guidance of Teachers in Scotch Schools.—Recent Inspection Sums will appear in future issues, when practicable, along with other matter that may be useful in preparing for examination.

SEWING EXAMINATION.

INFANTS.

(1) Needle drill. (2) Thimble drill. (3) Knitting pin drill.

A. Hemming.
B. Knitting (6 rows).

STANDARD I.

- *A.* Hemming (about 5 inches).
- *B.* Seaming and felling (about 5 inches).
- *C.* Knitting (6 rows showing chain edge).

STANDARD II.

- *A.* Seaming and felling (showing a join).
- *B.* Knitting (purl and plain, 12 rows).

STANDARD III.

- *A.* Stitching (about 2½ inches) and sewing on a tape.
- *B.* Darning on canvas (8 rows) and herring-boning (about 3 inches).

STANDARD IV.

- *A.* Gathering, stroking, and setting in (band 5 in.).
- *B.* Darn a hole and mark letters E and H.
- *C.* Work a button-hole and sew on button.
- *D.* Flannel patch.

STANDARD V.

- *A.* Tucking.
- *B.* Cut out and tack together a girl's pinafore.

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,

Ex-President of the N.U.E.T.

V.

AMONG the subjects for essays which form suitable exercises in composition for students such as these papers are intended to assist, none are likely to afford more useful practice than biographical sketches of eminent men. One advantage connected with such exercises is that the matter to be dealt with consists of facts with which the ordinary reading of a student must make him to some extent acquainted. Another is, that the process of producing a written composition helps to strengthen one's hold upon the knowledge one has already obtained, by the necessity for giving it definite shape. A third is, that in biographical notices the writer is obliged to direct his thoughts carefully to those incidents and qualities which distinguish the life and character of the subject of his sketch, and in this way the power is cultivated of forming and expressing opinions not only on the particular person written about, but on others with whom he may be naturally compared or contrasted.

One further reason for practising the writing of biographical essays which the candidate for examination must deem important is that the life of some person famous in history, literature, or science, is often appointed as the test in composition.

In writing a sketch of a person's life the student may very properly begin with a short statement indicating the special work or position which makes his subject an important person. He may then give a detailed narrative of the events of the life. And, lastly, he may sum up the results of the work accomplished by the person of whom he writes, with opinions on his character and influence, and a statement of the lessons which his life is calculated to teach.

It is needless to add a long list of biographical subjects; but Milton, Shakespeare, George Stephenson, Captain Cook, Wellington and Nelson are examples which often occur in examination papers, and are such as most students might fairly be expected to deal with.

The name we choose for the subject of our specimen essay is one we think peculiarly entitled to the attention of teachers, and specially suitable for the pages of an educational journal. It is the name of a man whose influence on modern literature and on English education is not likely soon to pass away—

MATTHEW ARNOLD.

As poet, critic, and philosopher, Mr. Matthew Arnold has for nearly forty years occupied a high place in the literary world; as educational reformer and school inspector he has for almost the same period held a unique position with regard to the question of national education.

Matthew Arnold was born in December, 1822, at Laleham, a quiet little Thames-side village, where his father, Thomas Arnold, was rector. His father had been educated at Winchester and Oxford, and became later, as Head Master of Rugby School, one of the greatest of schoolmasters, and famous for his wide-spreading moral influence.

After a course of private tuition Matthew Arnold was sent to Winchester school. For a time it is said he was rather unpopular among his school-fellows, because he had been heard to speak to a tutor of the slightness of the tasks required. This unpopularity, however, did not last long, when his companions came to know more of him, and when, within a year of his entering the school, he carried off the first prize for rhetoric, all were proud of him.

In 1837 he was taken from Winchester to be taught at Rugby. Here he worked steadily and successfully till 1841 when, having won the open scholarship at Balliol, he entered that college. During his career at Oxford he won the Hertford Scholarship for proficiency in Latin, and the Newdigate prize for a poem on 'Cromwell'; but he was disappointed at passing the final examinations in the second class. He was elected fellow of Oriel in 1845, a distinction his father had gained just thirty years before.

In 1847 he became private secretary to Lord Lansdowne, and in the next year he published his first volume of poetry,—'The Strayed Reveller and other Poems by A.' In 1851 he was appointed one of Her Majesty's Inspectors of Schools. This post he obtained, as he told a body of teachers in November, 1886, in order that he might be able to marry. His wife was a daughter of Mr. Justice Wightman.

He published 'Empedocles on Etna and other Poems' in 1853, still anonymously; but in the next year he published two series of poems with his name appended. The favourable impression these produced led to his election in 1857 to the Professorship of Poetry at Oxford, a position he continued to hold for ten years. During that time he delivered lectures on 'Translating Homer,' and on the influence of 'Celtic Literature,' and published 'Merope,' a tragedy fashioned on the model of the Greek Drama.

He became more famous, however, for his critical contributions to the periodical press, which from time to time, as they accumulated, have been re-published in volumes—'Essays in Criticism,' 'Culture and Anarchy,' 'St. Paul and Protestantism,' and several others.

In connection with the Duke of Newcastle's Commission on Education, Mr. Arnold was employed to visit and report on the primary schools on the Continent, and in 1861 he published a most valuable report on Education in France, Germany, and Holland. In 1865 he made a second tour to report on schools provided for the upper and middle classes, and the result was published in 1867. His last work of this special kind was to visit and report on certain features of continental education in 1885. This report is especially valuable at the present critical time in our educational system, and on that account has been issued as a very cheap pamphlet.

In recent years Mr. Arnold has entered much into theological and political controversy, though in the latter he has kept himself almost free from mere party views.

In the year 1884 Mr. Arnold went on a lecturing tour in America, and his discourses there were published in England the next year. A paper containing his impressions in America appeared in April last.

Besides the literary work already mentioned, Mr. Arnold edited selections from the poems of Byron and Wordsworth for the 'Golden Treasury' series, and a selection from Johnson's 'Lives of the Poets.'

The sudden death of Matthew Arnold on Sunday, April 15th, came as a shock upon his many friends and admirers in all parts of the civilised world. He had gone to Liverpool the previous Friday to meet his daughter, who was returning from America. Anticipating the meeting with her, he was in the most buoyant spirits. On Sunday morning he had attended service with his wife and friends, and during a walk in the afternoon he suddenly fell forwards, and died immediately from an affection of the heart. His loss to the world of letters, and to the cause of education can hardly be estimated; but his works remain, and through them and through the pleasant memory of the charm which his presence ever brought with it, his influence will still be felt, and will we trust continue to be potent for good. One thought of consolation that forces itself upon us is that he lived out a full life to the very end, and was thus spared all those pangs of slow decay which he has so beautifully, yet so sadly, depicted in his poem on 'Growing Old.'

> 'It is to spend long days
> And not once feel that we were ever young.'
> 'It is to suffer this,
> And feel but half, and feebly, what we feel.'
> 'It is—last stage of all—
> When we are frozen up within, and quite
> The phantom of ourselves,
> To hear the world applaud the hollow ghost
> That blamed the living man.'

Matthew Arnold was spared all this; and more than this, he died full of honour, full of influence, and with all that is best in the world's favour wrapping him round.

His poems are remarkable for the careful finish and clearness by which they are distinguished. There is also noticeable in most of them a tone of sadness. He has been called 'the finest elegiac poet of this century'; and this, when we remember that Shelley's 'Adonais' and Tennyson's 'In Memoriam'—certainly in some sort an elegiac poem—are brought into the comparison, is very high praise. Of his elegiac poems 'The Scholar Gipsy,' and 'Thyrsis,' a monody on his college friend Arthur Hugh Clough, who died at Florence in 1861, are most noteworthy. They are especially beautiful in the numerous passages of pastoral description. 'Rugby Chapel' is another favourite poem of this class. Among his other poems the best known are 'Sohrab and Rustum,' 'The Forsaken Merman,' 'The Strayed Reveller,' 'Empedocles on Etna.'

The prose writing of Matthew Arnold is also marked by those qualities of lucidity and moderation in statement which he so constantly held up as the wants of our time. A striking characteristic of his style is the use of a polished but playful irony. The irony was not the less effective because of its playfulness and good humour, while the shafts of his satire were the keener because of their polish. In many of his works too we have to notice the recurrence of certain phrases coined or adapted by the writer to indicate matters which he wished to emphasise either by way of praise or blame. 'The Philistines' represent the vulgar, the commonplace, the narrow, the insular, the provincial. 'Sweetness and light,' 'sweet reasonableness,' 'the stream of tendency,' are examples of those expressions which he has embalmed in our language by his skilful and persistent use of them.

Of his polemical writings in theology and politics this is not the place to treat, and therefore no more need be said than that his views and his mode of presenting them have commanded careful attention.

To teachers the influence of Mr. Arnold as a worker and writer in the cause of popular education is what marks him out for the highest distinction, and claims from them the heartiest meed of praise. In the address in which he took leave of the teachers in his district, he said, 'Though I am a schoolmaster's son I confess that school teaching or school inspecting is not the line of life I should naturally have chosen.' In spite of this, for thirty-five years he discharged duties, some of which he must have found specially irksome, in such a manner as to win the respect, the esteem, the affectionate regard of all with whom those duties brought him in contact. Why was this? Because he had got such a firm grasp of that best of all principles of criticism—put yourself in the place of those whom you would judge. This made him 'fair and sympathetic' as an inspector, as it made him clear and powerful as a literary critic. His breadth of view combined with his wide range of knowledge gained in his foreign educational tours, tended to eliminate fads and crotchets which, being allowed free development, spoil so many inspectors.

With regard to our educational system it is well known that it had not the approval of Mr. Arnold. He wished to see it broadened and simplified, made freer and better adapted to popular needs, as is plainly shown in his preface to the cheap edition of his last report on education abroad. But what he regarded with even more concern than the unsatisfactory nature of our primary instruction, which is at least organised, was the utter want of organization in our secondary education. He was always lamenting, even to weariness, the lack of what he spoke of as 'the one thing needful' in our social system,—'Unum porro est necessarium'—the organization on a sound basis of the education of our middle class. This need remains still unsupplied; but we know, from his own hand, that he trusted that the work which he had so much at heart, and for which he had laboured so earnestly, would be ultimately accomplished by the energy and persistence of younger men. May his life-long wish be speedily fulfilled!

(To be continued.)

Publications Reviewed.

The Royal Standard Readers. London: T. Nelson and Sons.

Standard I. The Six Birthdays.

Standard II. Stories and Pictures of Animals.

Standard III. The Corner Cupboard, or Stories of Common things.

Standard IV. Young Folks' Natural History.

Standard V. The Rocket.

Yet another series of reading books for elementary schools from the enterprising publishers of the Royal Readers! The distinguishing feature in this series consists in this, that the book for each Standard is based on some leading subject, so that although this is dealt with in separate short lessons of the ordinary type, there is a continuous thread of interest running through them all.

In 'The Six Birthdays' we have forty lessons founded on incidents in the first six years of a child's life, with a simple account of her toys, her pets, her friends and playmates, the fables and fairy-tales told for her amusement, and the verses she learns to repeat. The book includes a selection of poetry well adapted for recitation in the first Standard, and spelling, writing, and word exercises abound.

The Second Book contains an admirable course of lessons on domestic animals, and the best known of the wilder sort. There is a good supply of those anecdotes which always delight children, and the numerous illustrations deserve special praise. At the end of each lesson is an almost exhaustive set of helps to the understanding and appreciation of the matter it contains. A collection of poems suitable for repetition follows the prose readings.

In the 'Corner Cupboard' for Standard III. we find a continous narrative of a holiday two school-boys spent with their Aunt Martha. When tired of play out of doors they come to their Aunt for amusement, and want her to tell some stories, not the old tales they have heard before, but new ones. Much to their delight she tells them day by day the story of a Teacup, the story of Tea, of Sugar, of Coffee, of Salt, of the Plum cake, Currants, Rice, Honey, Pepper, Mustard, and other articles found in her Corner Cupboard. The whole course is well constructed, and imparts much useful information in a most interesting way. The poems near the end of the book are of a more advanced kind than in the earlier books, and include many children's favourites. A series of simple lessons in grammar is appended.

Book IV. takes up the subject of Natural History in a systematic way, dealing with animals according to classes, as four handed animals, flesh eating animals, insect eating—as moles, snouted—as elephants, hoofed—as horses, and others. This plan is likely to be much more beneficial than that of introducing an occasional lesson on some animal without any relation to what has preceded or what is to follow. Spelling, grammar, and poetry, have full attention as in the preceding books.

'The Rocket' gives us the story of George and Robert Stephenson, written in a style that cannot fail to interest boys in the fifth Standard. The invention and improvement of the steam locomotive derive importance from the marvellous changes which have sprung therefrom in the social life of this and other countries; but beyond that the record of the early struggles of the Stephensons and their friends have all the charm of romance. In this volume the story of engineering progress is told simply and forcibly; and lessons on Railways, Roads, Canals, and Steamboats are included. The appendix of poetry includes Macaulay's 'Horatius,' Gray's 'Elegy,' Hood's 'Song of the Shirt' and several other standard pieces, and all are suitably annotated. A series of grammar lessons follow, with copious exercises chosen from the reading lessons.

This new set of readers is marked by the attractive qualities which have made Messrs. Nelsons' works so popular in our schools, and is sure of a favourable reception.

The Oriel Geographical Readers. Standards V. VI. VII. London: Marcus Ward and Co. Limited.

These three volumes complete the series edited by Mr. A. Traill. They are distinguished by exceedingly clear typography, the proper names being brought out in bold Clarendon type. Coloured maps are effectively introduced into the text, and each book is well illustrated. The style in which the lessons are written is full of interest; for the writers in their description of countries and cities have seized upon those salient features which, by their remarkable character, are likely to attract attention and appeal to the faculty of wonder. They seem fully aware that this faculty may be made extremely useful in fixing geographical and other facts on the minds of children. Modern books of travel have been largely drawn upon, and this also helps to make the lessons more impressive, by giving an air of reality and truthfulness to the descriptions.

Several of the lessons in the seventh Standard book are based on the Cruise of the 'Challenger,' and some on other exploring expeditions in the Arctic Regions. In this book we have also a few colour-printed illustrations in the well-known style of Oriel House. A small number of appropriate poetical extracts are introduced to illustrate the subjects treated in some of the lessons. A summary of the principal facts for memory work concludes each book.

Arithmetic. By Charles Pendlebury, M.A., F.R.A.S.

Examples in Arithmetic. By Charles Pendlebury, M.A., F.R.A.S. London: G. Bell and Son.

This Arithmetic, which was very fully noticed in the February number of THE PRACTICAL TEACHER for 1887, has met with considerable success, for it has already reached a second edition. This edition does not materially differ from the first edition, the alterations principally consisting in the omission of matter of little consequence, and in the amplification of the explanations in the sections dealing with greatest common measure, decimalization of money, proportion, interest and cube root. No alterations have been made which will prevent the use of the second edition along with its predecessor. The book contains a splendid collection of arithmetical examples, almost unrivalled for variety and number, and the correctness of the answers may be relied upon.

The examples are also published without the answers in a separate book.

French Series:—Scribe's 'Le Verre d'Eau' (A. Barrère). Piron's 'La Métromanie' (Leon Delbos). Galland's 'Ali Baba' (A. Clare). London: Whittaker and Co.

That most productive playwright, *Scribe* himself, tells us that 'Le Verre d'Eau' is suitable for young people. Bristling as it does with idiomatic expressions, to enable students to read it with pleasure and profit, much help in the elucidation of the text is a prime necessity. The help here supplied in the notes is excellent, so far as it goes, but we could have wished the annotator had not been quite so chary of his notes.

Piron's '*La Métromanie*,' though incapable of moving our deepest feelings, is yet a very amusing play, and, being written in the purest French, is well suited to take its place among the volumes of this excellent French series. If the editor had not repeated the French text in his notes he would have been able to find room for additional notes. Yet the notes we have are to the point, and will help many readers over a difficult style.

Mr. Clare hopes that the story of *Ali Baba* will prove of great utility as a French Reader to students who already possess some knowledge of the language. In addition to the useful foot-notes there is a very necessary appendage to all works on languages intended for schools, viz., a vocabulary, which is wanting in the other two works.

Whittaker's Modern German Authors. London: Whittaker and Co.

These German Epic Tales, *die Niebelungen* (Aus 'Geschichte der Deutschen National-litteratur' von A. F. C. Vilmar) and *Walter und Hildegund* (Aus 'Deutsche Heldensagen' von Albert Richter) have been most ably annotated by C. Neuhaus, Ph.D. The Introduction and Notes which are very full and exhaustive—and properly so—take up a large proportion of the book. A most interesting specimen of the original text of the Niebelungen-song—the first 'Adventure,' with a literal translation on the opposite page, is given immediately after the Introduction. Advanced students, no doubt, will welcome and appreciate these two interesting specimens of German literature.

Benedix's Doktor Wespe. Edited by Professor F. Lange.

'Benedix' (says Dr. Lange) 'was essentially the clever child of his time, who delighted in a *common-place, middle-class conversation*,' and it is exactly for this reason that the works of Benedix afford such capital practice in idiomatic colloquial German. The excellence of Dr. Lange's editorial work is too well known to need any commendation at our hands. The usefulness of the book is further enhanced by a complete vocabulary.

Zopf und Schwert. Edited with Literary Introduction and Notes by Franz Lange, Ph.D. Whittaker and Co.

This historical comedy of the gifted but ill-fated Gutzkow, one of the most distinguished poets and novelists of modern German literature, in which the Court of Berlin of King Friedrich Wilhelm of Prussia is depicted with such humour and historical faithfulness, has been as carefully and admirably annotated by Herr Lange as the other excellent editions of German and French authors, published by Messrs. Whittaker, already so favourably noticed in the PRACTICAL TEACHER. The notes, though short, are to the point, and contain a large amount of valuable information on delicate points of German grammar, the derivation of words, and various other matters necessary to the elucidation of the text. Such editions as these cannot fail to promote the study of German and French literature in England.

Intermediate German Course. By Franz Lange, Ph.D. London: Whittaker and Co.

This work consists of two parts. Part I. contains the Elements of German Grammar; Part II. Materials for Translation, Dictation, and Extempore, also Conversation on the Translation and Grammatical Questions, and an English Extract to be rendered into German, with an English-German and German-English Vocabulary at the end. Both Parts are admirably worked out, and few books are better calculated to promote the study of German in England.

The Beginner's Book in French. With humorous pictures by Sophie Doriot. London: Swan, Sonnenschein, Lowry, and Co.

An admirable book for beginners. Miss Doriot very truly says: 'By giving children and other beginners subjects which they like, or which are calculated to excite their curiosity, they will, in order to conquer the point which is luring them, master words and expressions in a time and manner that will put to defiance the best arranged methods.' First, we have a humorous picture, under which there are a few lines of poetry, accompanied by an excellent vocabulary explaining all the words in the poetry, and lastly, questions and answers on the subject of the picture. Children have a remarkable facility for learning poetry, especially if repeated in chorus. The child or beginner who has committed to memory the poetry and vocabularies in this little book will have made a capital start towards acquiring a sound knowledge of the French language.

The French Idiomatical Pass-Key to Usual Conversation. By Charles Stuart-Merritt. London: David Nutt.

This book in its main features is like all the thousand and one books on French conversation, but in addition the editor and a friend not only give us fourteen pages of introduction *de omnibus rebus et quibusdam aliis*, but kindly throw us into the bargain some choice selections from Byron, Pope, Sir Walter Scott, Thomas Moore, and Longfellow. Before we are permitted to learn the French for, 'I have a pain in my stomach,' 'What's the matter with your nose,' &c., &c., we are asked to ponder over these lines from Scott:—

> 'There was a soft and pensive grace,
> A cast of thought upon her face,
> That suited well the forehead high,
> The eyelash dark and downcast eye;
> The mild expression spoke a mind
> In duty firm, composed, resigned.'

The book would be much improved by the omission of the poetry, and by printing the vocabularies in readable type.

A Companion to German Grammar and Composition. By D. Edwardes, M.A. London: David Nutt.

The plan of this work is excellent, but the execution is not satisfactory. Herz, das, the heart,—ens, en. What is a beginner to understand by —ens and en? N., Ac. Herz (n. heart), G. Herz—ens, D. Herz—en; Plur., all cases, Herz—en, would be much clearer, and would fill up the vacant space in Herz. *Help*, I cannot help it, *ich kann es nicht ändern*, might with advantage be omitted, and German examples quoted to the numerous important rules where a good example would have fixed the rule in the student's memory. This we consider a very serious mistake in an otherwise very useful book. In German, as in Greek, the particles doch, ja, wohl, &c., offer great, but not insuperable, difficulties for a foreigner. We find them very inadequately treated in the 'Companion,' and yet a good knowledge of them is quite indispensable to the understanding of the most ordinary German sentence, as well as for translating English into German: *ex. gr.*, Bringen sie mir das Buch = bring me the book; but Bringen sie mir *doch* das Buch = *pray* (or *if you please*) bring me the book. *Doch* softens an imperative. Again, es ist sonderbar = it is a strange thing; but, es ist *doch* sonderbar = it is *in my opinion* a strange thing. Here again *doch* softens an assertion = *I should think*. *Ja* has a greater force than *doch*. Fürchten sie es *doch* nicht = *pray* do not fear it; but, Fürchten sie es *ja* nicht = *I conjure you* not to be afraid. Sie sprechen nicht = you do not speak; but, sie sprechen *ja* nicht = *I am surprised* you do not speak. Das ist ein Brief von meinem Bruder = that is a letter from my brother; but, Das ist *ja* ein Brief von meinem Bruder = *why* (astonishment)! that is a letter, &c. With the modifications we have ventured to suggest we feel sure the 'Companion to German Grammar and Composition' will prove a very useful book.

Ralf's Rapid Road to Spanish. London: George Philip and Son.

This is far and away the best book for the rapid and pleasant acquisition of Spanish we have yet met with. There is not one dull page from beginning to end. The book is divided into two parts—Reading Lessons, &c., and Grammar—thus practice and theory go hand in hand. Each lesson consists of nine parts: (*a*) a Spanish extract with an interlinear pronunciation; (*b*) *free* translation of the extract; (*c*) a *literal* juxtalinear translation; (*d*) the pupil is then directed to turn to his grammar and learn certain portions necessary for the next step; (*e*) an analysis of (*a*) in the form of short sentences; (*f*) *tema*—English sentences (still taken from (*a*)) to be rendered into Spanish; (*g*) Spanish conversation *à la Otto*; (*h*) Spanish juxtalinear commercial correspondence; (*i*) each of the above parts accompanied by an excellent grammatical commentary. We venture to assert that no better system can be devised for the rapid and pleasant acquisition of a language. All the difficulties and peculiarities in the Spanish extract must be mastered in writing the exercises taken from it, and thus become, as it were, pegged down in the memory, thus following Professor Blackie's admirable system of learning a language. There are, however, several serious omissions and many cases of oversight which are most detrimental to the usefulness of the book. These we hope to see remedied in a future edition. *No rules are given for the accentuation of Spanish words.* How are *cc* pronounced? The accent on the verbs should be more carefully marked. Tuviére is marked tuvíere, &c. For beginners all inflections should be separated from the stem, thus: tuv-íste. The free translation might be advantageously omitted by simply inserting it in brackets where the literal translation does not correspond with the English idiom. No object is gained by repeating the text, p. 92. The space thus gained should be utilized for the insertion of reading lessons of quite a different style from those already given. All the endings at least of the irregular verbs should be printed in full. The Ejercicio preparatorio might be profitably extended. In the introduction the author says: 'It will perhaps surprise many to find that some *ten thousand words in Spanish can be readily learned in a single evening* by the adoption of the existing analogies.' See pp. 12 and 13. This book is nicely printed, and to all who wish to learn Spanish in a short time we can most cordially recommend it.

Merry Christmas; a Cantata for Schools and Families. By W. H. Doane. London: J. Curwen and Sons.

Written in Mr. Doane's usual style, bright, cheerful, and melodious, without any great tax upon the singers, this little cantata contains several attractive numbers, likely to prove favourites with the little ones.

Nelly's Dolly; and the Crafty Old Spider. Two Songs for Children. By A. Watson. London: J. Curwen and Sons.

We have much pleasure in calling attention to these publications. They are printed on good paper from bold and clear type, the voice parts being in both notations, with pianoforte accompaniment in staff notation only; and being full music size, and published at a shilling each, we hope the efforts of Messrs. Curwen, in attempting to produce sheet music at this low figure, will meet with the success they deserve.

The two songs before us are simple in style and interesting.

The 'Practical Teacher' Sale and Exchange Column.

For Sale.—Five vols. 'Casquet of Literature,' original price 7s. 6d. per vol.; in splendid condition; good as new; board backs; what offers? Also, Lee's 'Advanced Sound, Light, and Heat;' Faunthorpe's 'British Colonies.'—Address J. C. Harding, Post Office, Mow Cop, Stoke-on-Trent.

For Sale.—Davidson and Alcock's 'Analysis and Paraphrasing' (2s.), 1s. 4d.; Makay's 'Elements of Geography' (3s.), 1s. 6d.; Roullion's 'French Grammar' (5s.), 1s.; Mansford's 'Arithmetic' (4s. 6d.), 2s. 3d.; post free, E. Drury, care of F. Farrer, 67, Orsett-road, Grays, Essex.

What Offers?—Piper's 'Mental Arithmetic,' 2s.; Griffith's School Management;' Beeton's 'Classical Dictionary;' Weale's 'German Reader;' Weale's 'Philology,' 'Our Bodies,' 'Uses of Plants;' Weale's 'German Grammar;' 'Greek Antiquities,' all 1s. each; 'Comic Reciter; 'Our Young Ladies and Young Men;' Milton's 'Comus,' all 6d. each; Findlater's 'Language,' 10d.; 'Julius Cæsar' (Clarendon Press), 2s.; 'Comus' (Certificate), 3d.; Southey's 'Life of Nelson;' all new, or nearly.—J. Cameron, Schools, Wylam.

New.—Student's 'Hume' (7s. 6d.), for 3s. 6d.; Barnard Smith's 'Arithmetic and Key' (13s.), for 6s.; Mason's 'Grammar' (3s. 6d.), for 1s. 6d.; Curtis' large History (5s. 6d.), for 2s. 6d.; 'Her Majesty's Colonies' (5s.) for 2s. 6d. What offers for 'Practical Teacher' since August, 1884 (47 numbers), and 'Teachers' Aid,' since commencement (143 numbers). In good condition.—'Popular Educator' (numbers complete), 10s.; Morell's 'Grammar,' 9d.; Todhunter's 'Mensuration,' 1s.; Pott's 'Euclid,' 9d.; Hewitt's 'Colonies,' 9d.; Hamblin Smith's 'Algebra,' 1s. 3d.; Wood's 'Algebra,' 2s. 6d.; Todhunter's 'Trigonometry' (5s.), for 1s. 6d.; Colenso's 'Algebra and Key,' 4s. 6d.; Gladman's Method, for 1s., or offers to J. Bonson, 4, Penrhyn Villa, Springfield Road, Kingston-on-Thames.

For Sale.—Few good books, Capel, Hume, Abbott, & c., cheap,—Chapman, Browsholme, Clitheroe, Lancs.

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'Knowledge is proud that he has learned so much,
Wisdom is humble that he knows no more.'—COWPER.

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Pestalozzi.

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CHAPTER V.

THE METHODS OF PESTALOZZI.

The teaching of Pestalozzi may be considered a new point of departure in the history of education, but from the very fact that modern elementary education has been so completely Pestalozzianized we are apt to forget how much it owes to Pestalozzi. His principles have, in the main, met with such universal acceptance that they seem to be almost self evident, and to have come to us, as it were by the light of nature. We are inclined to ask, Who that had turned his attention to the subject, could fail to see that education in order to be successful must begin with the first dawn of intelligence, must follow the natural order of the development of the faculties, must start from the point at which the child is standing, and advance outward in concentric circles, to embrace wider and wider fields of knowledge? Yet it cost Pestalozzi the unremunerated labour of fifty anxious years, and the sacrifice of all that makes life dear, to bring home these and a few more equally elementary truths to the intelligence of mankind.

Are we then to suppose that no one ever thought of these 'principles' before Pestalozzi first promulgated and exemplified them? The wise man has told us that 'there is nothing new under the sun,' and it is true that most of the constituent parts of Pestalozzi's system are to be found scattered up and down like broken lights in the earlier history of education. His work consisted mainly in concentrating them into one focus. Thus Pestalozzi's fundamental principle, that the mother is the first and best of educators, and the home the first and best of schools, had been a leading feature in Roman education 2,000 years before. Luther, in the sixteenth century, and Comenius, the famous Moravian bishop, in the seventeenth, had taught that education should begin 'with the mother's school in every home.' Comenius again had anticipated Pestalozzi in enunciating the truth that education should follow the order and course of nature; and be so contrived as to take advantage of the fact that man has an innate tendency to improve the faculties with which he has been endowed. Again, the famous Jesuit teachers of the Renaissance anticipated Pestalozzi in seeing that a primary condition of success in education is to gain the confidence and attachment of the scholar, so as to be able, from thoroughly understanding his nature and character, to apply the guidance, encouragement, or restraint, best suited to the wants of the individual. From the example of the Jansenists of the two short-lived Port Royal Schools, Pestalozzi might have borrowed another leading feature of his system, namely, to discard emulation as an incentive to studious exertion, and to endeavour to supply its place by making the pupil find delight in the sense of his own accumulating knowledge and his own progress and growth in intellectual power.

Contrast between Pestalozzi's principles and his practice.

I use the expression 'might have borrowed' advisedly, for Pestalozzi apparently knew little, and cared less, for the previous history of educational experiments. It was one of the most unfortunate and fatal weaknesses of his position that he had early learned from his master, Rousseau, to 'hate and despise books,' and to recognise no merit or value in the exertions and the experiences of the great teachers who had preceded him. In what then does the importance and originality of his work consist? Chiefly in this, that having made out for himself a few leading principles which he believed to be true (and which turned out to *be* true in the main),—he set himself to the task of promulgating them with such dogged perseverance, such intensity of conviction, and such entire self-devotedness, that he compelled the world to listen to him at last. It was to this, 'the divine faculty of taking pains,' which, according to the Germans, is the true definition of genius,—that Pestalozzi owed his success as a practical teacher; for it must be confessed that there was hardly one of his own principles of education which he strictly carried out in the actual methods and conduct of his schools. In fact, he pathetically laments on more than one occasion the discrepancy between the beauty and truth of his principles and the imperfections of his practice. He was a poor unlearned man who had undertaken to grapple with some of the profoundest problems which have exercised the ingenuity of mankind; and though his insight was clear, and his objects sufficiently defined, he constantly felt the inadequateness of his practical powers to carry out his magnificent ideals. By way of illustrating the inconsistencies which appear in Pestalozzi's system when fact comes face to face with theory, it may be mentioned that while he justly regards the mother's instincts as the best guide to the treatment of the infant mind when it first begins to observe and inquire, he finds himself encountered by the difficulty that not one mother in ten is capable of the task of developing the perceptions of her child. He is compelled, therefore, to fall back upon 'Compendiums of Knowledge' to be put into the mother's hands—compendiums, which he asserts will 'enable the mother of the most limited capacity to instruct just as well as the most talented. The mothers have only to keep strictly to these books in the instruction of their children.' These compendiums brought down some not unnatural, and perhaps not altogether undeserved, ridicule upon their author's head. As an example of the method of teaching 'Language'—'the mother's spelling book,' says he, 'must contain the entire range of sounds of which the language consists, and portions of it should be repeated daily in every family, not only by the child who is going through the exercises in order to learn how to spell, but also by mothers, within hearing of the child in the cradle; in order that these sounds may by frequent repetition be so deeply impressed upon the memory of the child, even while it is yet unable to pronounce a single one of them, that they may never be forgotten. No one imagines to what a degree the attention of infants is aroused by the repetition of such simple sounds as ba, ba, ba, da, da, da, ma, ma, ma, la, la, la, or what a charm such repetition has for them.' On this passage, one of Pestalozzi's biographers remarks, 'if the rocking songs sung to the babe in the cradle are to consist of such bleatings as these, it is enough to frighten away its guardian angels.'

Again he constantly enlarges, and justly, on the mischief arising from mere word-knowledge in education, as opposed to the knowledge derived from perception and experience. 'In our lower school establishments,' he says, 'the mind is loaded with a burden of empty words which has not only effaced the impressions of nature, but has even destroyed the inward susceptibility to such impressions.' But in the book for mothers, and indeed elsewhere, occur passages which seem to show that Pestalozzi attributed something little short of a magical power to words. The lessons prescribed by him are found to consist not even in the naming of objects, so much as in the acquisition of names, for their own sake. For example:—'Lessons in nature consist in giving the children lists of the names of the most important objects in all three kingdoms of nature, etc. The lists of words are placed in the hands of the child merely as exercises in learning to read; and I have found that it is possible to make the children so thoroughly acquainted with these lists of words that they shall be able to repeat them from memory in the time that is required to perfect them in reading.' As an example of a less objectionable but still quaint and roundabout method of 'teaching language through observation,' the following passage is quoted from the experiences of Ramsauer, who has been already mentioned as a pupil of Pestalozzi. 'The hangings (in the castle of Burgdorf) were very old and torn, and in front of these we had frequently to stand for two or three hours together, and say what we noticed in respect of the form, number, position, and colour of the figures painted on them, and the holes torn in them, and to express what we observed, in sentences gradually increasing in length. On such occasions he would say, "Boys, what do you see? (He never named the girls.) *Answer:* "A hole in the wainscot." *Pestalozzi:* "Now repeat after me:—I see a hole in the wainscot—I see a long hole in the wainscot—through the hole I see the wall—through the long narrow hole I see the wall. I see figures on the paper-hangings—I see black figures on the paper-hangings—I see round black figures on the paper-hangings—I see a square yellow figure on the paper-hangings—and so on."'

And this curious illustration of his practical subordination of observation and association to names and mechanical detail, is to be found in the method which he actually employed in teaching geography. He proceeds thus:—'One of the sub-divisions of Europe is Germany. The child is first of all made acquainted with the divisions of Germany into ten circles, then the names of the towns of Germany are placed before him, at first in mere alphabetical order for him to read, but each of these towns is previously marked with the number of the circle in which it lies. As soon as the child can read the names of the towns fluently he is taught the connection of the numbers with the subdivision of the main-heads, etc., etc.' In all this, be it observed, there is no hint of the use of a map.*

But not to weary the reader with further details, it may be said that Pestalozzi has, as it were, set his own seal and signature to the indictment which experience has brought against his *methods,* in recording the following incident. M. Glayre, a member of the Executive Council of Bern, on hearing an explanation of his system, came out with the ominous remark, 'You want to make education mechanical.' 'He hit the nail on the head,' says Pestalozzi, 'and supplied me with the very expression that indicated the object of my endeavours, and the means which I employed for attaining it.' It must be borne in mind that Pestalozzi was a self-taught man, and all the blunders which occasionally deface his system were those of a self-taught man. It has been well said of him that 'he wanted the historical basis.' Methods which had been discovered long before, tried and found wanting, appeared to him as new revelations made to himself, and he had to learn their inefficiency by bitter personal experience—and at his pupils' cost. Everything had to be 'evolved,' like the well-known German camel, 'out of his own consciousness,' and he exhausted himself in inventing expedients which either were worthless when brought to a practical test or had been invented and brought to perfection long before, if he had only known of them.

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* It is only fair to state here *in Pestalozzi's own words the* method of teaching geography *which he believed to be the right* one, and which has now been, in its general outlines, adopted by most intelligent teachers:—

'The instruction in this subject begins with the observation of the district in which we live, as a type of what the surface of the earth presents. It is then separated into elementary instruction (*a*) including physical, mathematical, and political geography, and (*b*) the typographical part in which each of the departments of the subject, suggested by the observation of the surrounding district, is prosecuted in a graduated course, and then reciprocal bearings brought out. By this foundation the pupils are prepared for forming a clear and comprehensive view of the earth and man, of their mutual influences, of the condition of states and peoples. The children are made acquainted with the statistical portion of the subject, that is, the natural productions, numbers of population, forms of government, etc.—by means of tabular views.'

These inconsistencies have been dwelt on thus far, and at some length, partly because they seemed necessary elements in a true portraiture of Pestalozzi, and partly to account for the fact that many of his *Methods* have been consigned to a not wholly unmerited oblivion, while his *Principles* have exerted an ever-growing influence on popular education—stronger, perhaps, at the present time than when he was their living exponent, and at the zenith of his reputation. His principles are immutable, his methods were experimental; and many of them, though condemned by himself on trial, have been unfortunately perpetuated by injudicious disciples, to the disadvantage of elementary education and the detriment of Pestalozzi's fame.

Of these methods, however, some few which contained a richer and more fruitful germ, have developed into a world-wide utility. Among these may be mentioned the plan of simultaneous syllabic reading—of mutual instruction—of teaching form and number by concrete examples, which forms the basis on which Fröbel built up his famous superstructure of the Kindergarten—and lastly, the introduction of object lessons, which now enter largely into the programme of every good infant school. Of these, the first two were almost forced upon him by the circumstances of his position. (1) Of simultaneous reading Pestalozzi says, 'The confusion arising from a number of children repeating at once, after me (their sole teacher at Stanz), led me to see the necessity of a measured pace in reading and speaking, and this measured pace heightened the effect of the lesson.' (2) It was at Stanz also that he first hit upon the expedient, afterwards so largely adopted by Bell and Lancaster, of setting children to teach children. But Pestalozzi's plan was very different from what was known in England as the 'Monitorial System,' by which 'one child was drilled through an artificial machinery of lifeless tasks, and the child so drilled employed, for pay, to drill others in the same manner and by the same means.' 'Seeing that I had no assistant teacher,' says Pestalozzi, 'I placed a child of superior capacity between two others. He threw his arms round their necks; he taught them all they knew; they learnt from him what they knew not; they sat by the side of each other with heartfelt affection; joy and love animated their souls; the life which was awakened in them, and which had taken hold of their minds, carried both teacher and learners forward with a rapidity and cheerfulness which this process of mutual enlivening alone could produce.'

Pestalozzi was in the habit of dividing the elements of knowledge into three branches—Language, Form, and Number. It is hardly necessary to point out that these three categories do not embrace the whole field of knowledge in its most elementary aspect. There are numberless phenomena which present themselves to the observation of a child which have nothing to do with language, form, or number,—but for practical purposes Pestalozzi tells us he found this classification work well.

(*To be continued.*)

How a Scotch School was Examined.

Infant School.

On coming into the room the Inspector asked for the schedule and cancelled the absentees, and then heard the whole sing from the modulator, pointing the syllables himself. The intervals were rather difficult—

d m s d' d' m l f r, &c.

One *action* song was asked, and out of a list of twenty object lessons he chose that on a 'Chair' to be given by the teacher.

Reading.—Every one read—the highest class professing Collins's Infant Reader.

Writing.—The whole of the alphabet—both capital and small letters were asked and carefully examined.

Arithmetic.—Mental arithmetic in addition and subtraction of numbers up to 16 was given by the teacher.

Junior Department.

Standard I.

Professed two sets of Readers—Blackie's Graded and Nelson's Star Reader. It was a large class occupying five forms, with fifteen on each form. One form read, another wrote a line, while a third worked the following sums, which were given out in words:—

(1) Add 319, 790, 909, 51, 815.
2,884. Ans.

(2) Add 987, 789, 867, 759, 949.
4,351. Ans.

(3) From 900 take 29. 871. Ans.

The rest of the class was not examined.

Standard II.

Showed writing copies, and was examined like Standard I., being asked for nouns, and also tried with verbs and adjectives. Dictation was taken from their own set of reading books. 'Often the hunters approach quite near to a tiger before they see it, as the striped skin of the animal is so like the colour of the forest grass.'

Arithmetic.—These sums were read out in words:—

1. 2,005 + 5,010 + 20 + 3,010 + 990 + 9,060.
20,095. Ans.

2. From 2,090 take 19. 2,071. Ans.

The following were given out in figures:—

3. From 12,986,530 take (beginning below the 9) 897,019. 12,089,511. Ans.

4. Multiply 975,607 by 6. 5,853,642. Ans.

The scholars were placed back to back.

The intelligence of the class was tested with closed books in batches of six.

Senior Department.

Music and Singing.—After a modulator exercise introducing **ta** and **fe**, as **d' ta l s fe s**, the children were tested with moderately difficult ear exercises, such as **l f r**; **d r m**; **m f s**; **d m s f r d**, sung by the teacher to the syllable la.

Singing test.—Key D.

| **d** :**m** | **s** :d^{1} | **l** :**f** | **r** :**d** | s_{1} :l_{1} | t_{1} :**d** ||

Time test.—

| **l** :— | — :— | : | **l.l** : **l.l** | **l** : | **l** :— ||

Questions were asked regarding number of pulses and beating of time. Two songs were sung after the girls and boys had sol-fa'd their parts separately from the book.

STANDARD III.

Read a lesson from one set; closed books; read a lesson from second set; closed books and read again from first set, and so on alternately till the whole had read.

Intelligence was carefully tested, and the recitation afforded ample field for meaning of phrases and single words, not a line being omitted.

Dictation (read out by a pupil teacher):

'All over Scotland there are thousands of sheep and lambs that graze on the hills and plains, and in the lovely valleys. Are they put there merely to be looked at? No; they are there for use. They yield not only a great amount of food, but also large supplies of wool, which is made into clothing.'

Grammar.—Taken (1) on black-board—a subject and predicate being written, and the scholars asked to complete the sentence with an object if necessary, subjects and predicates being similarly required. (2) Sentences were given on slates, to be analysed in writing. (3) Parts of speech were asked as a voluntary exercise.

Arithmetic.—Cards were given out. Example:—

1. Multiply nine hundred and seventy-five thousand eight hundred and sixty by eight thousand and ninety. 7,894,707,400. Ans.

2. Divide three hundred and ten thousand and sixty-eight by eighty-one (factors). 3,828. Ans.

3. Divide 7,345,678 by 871. $8{,}433\frac{535}{871}$. Ans.

4. Take £309 10s. $4\frac{3}{4}$d. from £1,000.
£690 9s. $7\frac{1}{4}$d. Ans.

Geography.—Physical features of Scotland. As many different names for Capes as possible—definitions and illustrative examples.

History.—A pupil teacher questioned on the 'Life of Bruce,' and the Inspector took the chief incidents in the reign of Mary.

STANDARD IV.

Read out of one set of books and were tested for intelligence with closed books.

Analysis was tested on black-board and on slates. Construction of sentences introducing adjective and adverbial phrases was asked, and every word was parsed as it came in the sentence.

Dictation.—'Often when the mocking-bird is watching by the nest in which his mate is sitting, a rustling is heard among the leaves at the foot of the tree. Then two bright eyes glisten through the foliage; and presently a shining body begins to wreathe itself round and round the trunk, and slowly to ascend. It is the black snake, who has scented the eggs of the mocking-bird, and is determined to make a feast of them.'

Arithmetic:

1. Divide £81,068 0s. 7d. by 273.
£296 19s. $0\frac{1}{2}\ \frac{106}{273}$d. Ans.

2. How many seconds are there in the month of January? 2,678,400 secs. Ans.

3. Reduce two hundred and nineteen square miles to poles. 22,425,600 poles. Ans.

4. How many threepences are there in seven thousand and ninety-nine pounds nineteen shillings and ninepence? 567,999 threepences. Ans.

Geography was tested by questions on the physical features of Ireland, and its chief towns.

History.—A searching examination was made respecting the events leading up to the Revolution; the Revolution and its results.

Repetition taken as in Standard III.

STANDARD V.

Reading from one set of books. One sentence, if well read, was sufficient for a pass.

Composition.—The title of the story was 'Finding out a Thief.'

Parsing and Analysis were tested from the reading lesson. No one was questioned on the construction of sentences.

Arithmetic:

1. Find by practice the value of 356 cwts. at £2 17s. 9d. per cwt. £1027 19s. Ans.

2. Make out the following bill:—
83 yds. at 3s. $9\frac{1}{2}$d. each.
39 lbs. at 2s. $4\frac{1}{2}$d. each.
90 pencils at 6d. per dozen.
(£15 14s. $8\frac{1}{2}$d. ÷ £4 12s. $7\frac{1}{2}$d. + 3s. 9d.) =
£20 11s. 1d. Ans.

3. How many tons can I purchase for £29 3s. 4d. at 7d. per cwt.? 50 tons. Ans.

4. $\frac{5}{6}$ of $\frac{24}{35} \div 3\frac{3}{7}$. $\frac{1}{8}$. Ans.

Geography.—A drew a map of France, B a map of Australia, C a map of Spain, and put in mountains and rivers. They were examined orally on Australia and the rivers and mountains of Europe.

History.—American War of Independence; causes of the war; leaders; events; decisive victories. The French Revolution was tested in the same way, particular reference being made to the career of Lord Nelson.

Repetition was rigidly tested, as well as the meaning of the whole piece professed, no word or phrase of any consequence being passed over.

STANDARD VI.

Reading from one set of books—Star Reader No. VI. 'An Ancient Roman Holiday,' 'Moses at the Fair,' and 'Paper.'

Parsing and Analysis were taken from paragraph 2, 'Paper,' page 84, and questions were asked as to what constituted complex and compound sentences.

Essay.—A was to write a 'Description of a Walk in the Country.' B the 'Biography of a Horse or of a Dog.' C 'Description of a Menagerie.'

Arithmetic:

1. A cistern containing 1,500 gallons can be emptied by three pipes in 24 hours. In what time would another cistern containing 500 gallons be emptied by six pipes? 4 hrs. Ans.

2. If I own $\frac{4}{15}$ of a house and sell $\frac{5}{8}$ of my share for £450, what is the value of the whole? £2,700. Ans.

3. Add $2\frac{5}{8}$ of 2s. to ·4375 of 16s., and express the result as the decimal of 10s. 1·225. Ans.

4. Find the simple interest on £235 for 292 days at $2\frac{1}{2}$ per cent. £4 14s. Ans.

History.—Questions on the various Reform Bills, Education Acts, Russian War of 1854—55, and the History of the Indian Mutiny.

Geography of India, the physical features requiring a thorough acquaintance with the map. Historical associations of the country. No. 1 drew India; No. 2 Africa; No. 3 Cape Colony.

Repetition.—'Parting of Marmion and Douglas,' and some lines from the 'Prisoner of Chillon;' meaning and allusions were strictly tested, but little or nothing was asked about the formation of words.

The sewing was taken a Standard lower, and every item as given in Schedule 3 was asked. Specimens were vigorously tested as to firmness and capability of withstanding tear and wear. The Inspector for example pushed his finger through the button hole, stretched the stockings, pulled the patch, and strained the darn.

The pupil teachers were examined in teaching: one took an object lesson on the 'Sheep,' and another examined Standard I. on Arithmetic.

The class and general registers were tested by names taken at hap-hazard from examination schedules.

The general results of the examination were known before the Inspectors left, as the teachers were allowed to help in examining the Arithmetic and Dictation.

The Glass of Water; or, Cause and Effect.

(Comedy in Five Acts.)

LE VERRE D'EAU; OU, LES EFFETS ET LES CAUSES.

(Comédie en Cinq Actes.)

Scène III.	Scene III.
Les mêmes, Abigaïl.	The same with Abigail.

Abigail.

Monsieur de Saint-Jean !	Monsieur de St. Jean !
[*Elle se retourne vers Masham à qui elle tend la main.*	[*She turns to Masham to whom she holds out her hand.*

Bolingbroke.

Lui-même, ma chère enfant ;	The same, my dear child ;
et il faut que vous soyez née	and you must have been born
sous une heureuse étoile !...	under a lucky star !...
la première fois que vous venez à la cour,	the very first time you come to the Court,
y trouver deux amis ! ...	to find two friends there !...
rencontre bien rare en ce pays !...	a meeting very rare in this country !...

Abigail.

[*gaîment.*	[*gaily.*
Oui, vous avez raison,	Yes, you are right,
j'ai du bonheur !...surtout aujourd'hui...	I have some good luck !... especially to-day...

Masham.

Vous voilà donc décidée	You have then made up your mind
à vous présenter	to present yourself
chez la duchesse de Northumberland ?	before the Duchess of Northumberland ?

Abigail.

Vous ne savez pas !	You do not know !
j'ai appris que la place était donnée...	I have heard that the place was given away...

Masham.

Et vous êtes si joyeuse ?	And yet you are so happy ?

Abigail.

C'est que j'en ai une autre !...	Because I have another !...
plus agréable, je crois...	a more pleasant one, I think...
et que je dois...	and which I owe...

Masham.

A qui donc ?	To whom ?

Abigail.

Au hasard.	To chance.

Bolingbroke.

Cela vaut mieux !...	That's better !...
c'est le plus commode et	It (chance) is the most obliging
le moins exigeant des protecteurs.	and the least exacting of protectors.

Abigail.

Imaginez-vous que	Just fancy that
parmi les belles dames	among the beautiful ladies
qui fréquentaient les magasins de monsieur Tomwood,	who frequented Mr. Tomwood's shop,
il y en avait une	there was one
fort aimable, fort gracieuse,	very amiable, very gracious,
qui s'adressait toujours à moi,	who always came to me,
pour acheter...or,	when she bought anything ...now,
en achetant des diamants... on cause...	when purchasing diamonds ...people chat...

Bolingbroke.

Et Miss Abigail cause très-bien...	And Miss Abigail speaks very nicely...

Abigail.

Il me semblait que cette dame	It seemed to me that this lady
n'était pas très-heureuse dans son ménage...	was not very happy in her married life...
qu'elle était esclave dans son intérieur,	that she was a slave in her private life (in her home),
car elle me répétait souvent avec un soupir...	for she often said to me with a sigh...
Ah ! ma petite Abigaïl,	Ah ! my little Abigail,
que vous êtes heureuse ici,	how happy you are here,
vous faites ce que vous voulez...	you do just what you please...
Si on peut dire cela...	How can anyone say such a thing...
moi qui, enchaînée à ce comptoir,	I who, tied to a counter,
ne pouvais le quitter...	cannot leave it...
et ne voyais monsieur Masham	nor see Mr. Masham but

que le dimanche après la messe,	on Sundays after mass,
quand il n'était pas de service à la cour...	when he is not on duty at the Court...
Enfin un jour...il y a près d'un mois,	At last one day...about a month ago,
la belle dame eut la fantaisie	the handsome lady took a fancy
d'une toute petite bonbonnière en or,	to a very tiny gold lozenge box,
d'un travail exquis...presque rien...	of exquisite workmanship... a trifle...
trente guinées !... Mais elle avait oublié sa bourse...	thirty guineas...but she had forgotten her purse...
et je dis :	and I said :
On enverra ce bijou à l'hôtel de milady...	This box shall be sent to my lady's mansion...
Mais milady, que cela semblait embarrasser,	But my lady, whom that (offer) seemed to embarrass,
hésitait à nommer son hôtel,	hesitated to name her abode,
sans doute à cause de son mari...	no doubt on account of her husband...
à qui elle ne voulait pas dire...	to whom she did not wish to speak of it...
il y a de grandes dames	there are great ladies
qui ne disent pas à leur mari...	who do not like to tell everything to their husbands
et je m'écriai : Gardez, gardez, milady,	and I said : Take it, take it, my lady,
je prends tout sur moi.	I will be responsible for it.
Vous daignez donc être ma caution ?	You are willing really to be my security ?
répondit-elle avec un sourire charmant...	she exclaimed with a bewitching smile...
C'est bien, je reviendrai !...	Very well, you will see me again soon !...
—Mais pas du tout,	—But not at all,
c'est qu'elle ne revint pas...	she did not return...

Bolingbroke.

[*riant.*	[*laughing.*
La grande dame était une friponne.	The great lady was a swindler.

Abigail.

J'en eus bien peur...	I was very much afraid she was,
car un mois s'était écoulé...	for a month had slipped away...
Monsieur Tomwood était bien mal dans ses affaires,	and Mr. Tomwood was in very bad circumstances.
et les trente guinées dont j'avais répondu,	The 30 guineas for which I was responsible
je les devais à lui...	must be paid either to him...
ou à ses créanciers...	or to his creditors...
C'était là ce qui me désolait,	That was what troubled me,
ce dont, pour rien au monde, je n'aurais osé parler à personne...	and I dared not speak of it to anyone...
mais j'étais décidée à vendre	but had resolved to sell
tout ce que je possédais...	all I possessed...
mes plus belles robes, même celle-ci,	my finest dresses, even this one,
qui me va bien, à ce qu'on dit.	which suits me so well, people say.

Bolingbroke.

Très-bien.	Very well indeed.

Masham.

Et qui vous rend encore plus jolie,	And which makes you still more beautiful,
si c'est possible.	if possible.

Abigail.

Voilà pourquoi j'avais tant de peine	That is why it was so difficult for me
à me decider...Enfin j'étais résolue...	to decide... At last I had decided...
lorsque hier au soir	when yesterday evening
une voiture s'arrête à la porte,	a carriage stopped at the door,
une dame en descend, c'était milady...	a lady got out of it—it was my lady...
'Bien des affaires trop longues	'Important business too long
à m'expliquer l'avaient retenue...	to explain had detained her...
et puis elle ne pouvait sortir	and besides she could not leave
de chez elle à sa volonté...	home when she chose...
et elle tenait cependant	and yet she was anxious
à venir elle-même s'acquitter'...	to come and pay her debts herself'...
Tout en parlant elle avait remarqué	While she was speaking she observed
que j'avais encore des larmes dans les yeux,	that I had still tears in my eyes,
quoique je me fusse hâtée	although I hastened
de les essuyer à son arrivée.	to dry them when she arrived.
Il fallut bien alors lui raconter	I was compelled to tell her
et ma détresse, et ma position,	of my distress, position,
et l'embarras où je me trouvais...	and the trouble in which I was:...
elle avait tant de bonté...	She was so kind...
et moi tant de chagrin !	and I was so put out !
Enfin je lui parlai de tout,	At last I told her about everything,
excepté de monsieur Masham...	except about Mr. Masham...
et quand elle sut que je voulais,	and when she heard that I intended,
ce matin, me présenter chez la duchesse de Northumberland...	this morning, to go to the Duchess of Northumberland...
c'est elle qui me dit :	she said :
N'y allez pas,	'Do not go there,
vous seriez trop malheureuse...	you would be unhappy...
d'ailleurs la place est donnée...	besides the place is filled up...
Mais moi, mon enfant,	but my child,
je tiens dans le monde et à la cour	in society and at Court I keep up
une maison assez considérable...	a large establishment...
où, par malheur,	in which, unfortunately,
je ne suis pas toujours la maîtresse...	I am not always the mistress...
n'importe, je vous y offre une place...	Never mind, I offer you a place there...
voulez-vous l'accepter ?...	will you accept it ?...
Et je me jetai dans ses bras en lui disant :	I threw myself into her arms, saying :
Disposez de moi et de ma vie...	Do what you like with me and my life...
je ne vous quitterai plus,	I will never leave you,
je partagerai vos peines et vos chagrins...	I will share your griefs and your sorrows.
—C'est bien, me dit-elle avec émotion ;	—Very well, said she with much emotion ;
présentez-vous demain au palais,	present yourself to-morrow at the palace,
et demandez la dame dont je vous donne le nom.	and ask for the lady whose name I give you.
Elle écrivit alors sur le comptoir deux mots	She then wrote on the counter two words
que j'ai pris, que j'ai là...et les voici.	which I took and which I have here...here they are.

Masham.

C'est très-singulier...	'Tis very singular...

Bolingbroke.

Et ce papier, peut-on le voir ?	May we see the paper ?

Abigail.

[*le lui donnant.*	[*giving it him.*
Certainement !...	Certainly !...

Bolingbroke.

[*souriant.*	[*smiling.*
Ah ! ah ! rien qu'à sa bonté,	Ah ! Ah ! From her kindness alone
je l'aurais devinée.	I should have guessed it.
(*A Abigail.*) Ce mot a été écrit devant vous,	(*To Abigail.*) Was this word written before you
par votre nouvelle protectrice ?...	by your new protectress ?

Abigail.

Oui vraiment... Est-ce que, par hasard,	Yes, of course... Do you happen
vous connaîtriez cette écriture?	to know the writing ?

Bolingbroke.

[*froidement.*	[*coolly.*
Oui, mon enfant...	Yes, my child,...
c'est celle de la reine.	it is the Queen's writing.

Abigail.

[*avec joie.*	[*joyfully.*
La reine !... est-il possible ?	The Queen...Can it be possible ?

Masham.

[*de même.*	[*joyfully.*
La reine vous donne	The Queen offers you
une place auprès d'elle...	a place near her person...
et sa protection !... et son amitié...	her protection !...and her friendship...
voilà notre fortune assurée à jamais.	Your fortune is made for ever.

Bolingbroke.

[*passant entre eux deux.*	[*passing between the two.*
Attendez, mes amis, attendez...	Wait, my friends, wait...
ne vous réjouissez pas trop d'avance !	do not rejoice too soon !

Abigail.

C'est la reine qui l'a dit,	The Queen herself said so,
et une reine est maîtresse chez elle !	and the Queen is mistress in her own house !

Bolingbroke.

Pas celle-là...Douce et bonne par caractère,	Not that one...Gentle and good in disposition,
mais faible et indécise,	but weak and undecided,
n'osant prendre un parti	not daring to take any side
sans prendre l'avis de ceux qui l'entourent,	without asking the advice of those who surround her,
elle devait nécessairement	she must of necessity
se laisser subjuguer	allow herself to be ruled
par ses conseillers et ses favoris,	by her councillors and favourites,
et il s'est trouvé près d'elle	and there happened to be about her person
une femme à l'esprit ferme,	a woman with a strong will,
résolu et audacieux,	resolute and bold,
au coup d'œil juste et prompt,	with an accurate and rapid glance,
qui vise toujours droit et haut !...	which is always directed straight and high !...
c'est lady Churchill,	It is Lady Churchill,
duchesse de Marlborough,	Duchess of Marlborough,
plus grand général que son mari lui-même,	a greater general than her husband himself,
plus adroite qu'il n'est vaillant,	more skilful than he is valiant,
plus ambitieuse qu'il n'est avare,	more ambitious than he is miserly,
plus reine enfin que sa souveraine,	more a queen, in short, than her sovereign,
qu'elle conduit et dirige par la main...	whom she leads and directs with her hand...
la main qui tient le sceptre.	that hand which holds the sceptre.

Abigail.

La reine aime beaucoup cette duchesse ?	Does the Queen then love this Duchess much ?

Bolingbroke.

Elle la déteste !...	She hates her !...
en l'appelant sa meilleure amie !...	although all the while she calls her her best friend!...
et sa meilleure amie le lui rend bien.	and her best friend pays her back in her own coin.

Translate into French the following sentences taken from the 'Verre d'Eau.'

Scene 3.

Now I have made up my mind. We were in bad circumstances. It was so difficult for me to find her. They were anxious (tenir à) however to come themselves. We should have guessed it from their kindness alone. I hate her and she pays me back in my own coin. If that is the case we have some hope. What goodness! I have not much faith in it. Another affair which I have so much at heart.

(*To be continued.*)

—o—

Jeanne d'Arc, by Lamartine.

TRANSLATED BY A. M. BOWER,

Late Master in University College School, London.

XII.

JEANNE D'ARC.	JOAN OF ARC.
Son père, homme d'âge et austère,	Her father, an aged and austere man,
entendit avec peine ces bruits	heard with sorrow these reports
de visions et de merveilles	of visions and miracles
sous son toit de paysan.	under his peasant roof (= in his humble home).
Il ne croyait point sa famille	He did not consider his family
digne de ces faveurs dangereuses du ciel,	worthy of these dangerous heavenly visions,
de ces visites d'anges et de saintes	of these visits of angels and saints
qui faisaient causer ses voisins.	which made the neighbours gossip.
Toute relation avec les esprits	All connection with spirits
lui était suspecte,	was suspected by him,
à une époque surtout où	especially at a time when
la crédulité superstitieuse	superstitious credulity
attribuait tant de choses	attributed so many things
aux mauvais esprits,	to wicked spirits,
et où l'exorcisme et le bûcher	and when exorcism and the stake
punissaient tout commerce	punished all intercourse
avec le monde invisible.	with the unseen world.
Il attribuait ces mélancolies	He (her father) attributed this melancholy
et ces illusions de sa fille	and these illusions of his daughter
à des désordres de santé.	to a bad state of health.
Il désirait la marier,	He wished to get her married,

afin que l'amour d'un époux	so that her love for her husband
et des enfants apaisât son âme,	and her children might soothe her mind,
et que les distractions de la mère de famille	and (in order that) the thoughts of the mother of a family
fissent évaporer ces imaginations.	might cause these thoughts (fancies) to pass away.
Il poussa quelquefois	Sometimes he pushed
l'incrédulité jusqu'à la rudesse ;	his unbelief to harshness ;
il dit à Jeanne que,	he told Joan that,
's'il apprenait qu'elle donnât créance	'if he found that she gave credence
à ses prétendus entretiens	to these pretended conversations
avec les esprits tentateurs	with tempting spirits
et qu'elle se mêlât	and if she mingled with
aux hommes de guerre,	men of war (soldiers),
il la voudrait voir	he would like (wish) to see her
noyée par ses frères,	drowned by her brothers,
ou qu'il la noierait lui-même	or he would drown her himself
de ses propres mains.'	with his own hands.'

XIII.

Ce déplaisir de sa mère	The displeasure of her mother
et ces menaces mêmes	and even the threats
de son père n'étouffaient	of her father stifled
ni les visions ni les voix.	neither the visions nor the voices.
Obéissante en toute autre chose,	Obedient in everything else,
Jeanne désirait obéir même en ceci ;	Joan wished to be obedient even in this ;
mais l'inspiration était	but the inspiration was
plus obstinée que la volonté.	stronger than her will.
Le ciel devait être obéi	Heaven must be obeyed
avant les hommes,	before man,
et le prodige était pour elle	and the heavenly sign was for her
plus impérieux que la nature.	more imperious (authoritative) than nature.
Elle gémissait de désobéir,	She lamented her disobedience,
et elle suppliait Dieu	and she besought the Almighty
de lui épargner ces efforts	to spare her these struggles
qui déchiraient son cœur.	which tore her very soul.
Elle espérait bien	She hoped indeed
obtenir plus tard le congé	later to obtain the leave (permission)
et le pardon de ses parents,	and the pardon of her parents,
comme, en effet,	as, in fact,
ils lui pardonnèrent	they pardoned her
quand sa gloire eut justifié	when her glory had justified
à leurs yeux sa désobéissance.	in their eyes her disobedience.
L'inspiration est comme le génie :	Inspiration is like genius :
on ne la couronne	we only crown it
qu'après l'avoir combattue.	after having fought with it.

XIV.

Mais il y avait à côté de Jeanne	But there was at Joan's side
un homme de son sang,	a man of her own family,
plus simple que son père,	more simple than her father,
ou plus tendre ou plus enthousiaste,	or more tender and enthusiastic,
dans le sein de qui	in whose heart
la pauvre inspirée trouvait	the poor inspired (girl) found
créance ou du moins pitié ;	credence or at least pity ;
c'était son oncle,	that was her uncle,
dont l'histoire aurait dû conserver	of whom history ought to have preserved
la figure et le nom,	the portrait and the name,
car il fut le premier croyant	for he was the first believer
à sa nièce et le premier complice	in his niece and the first who was aware
de son génie.	of her genius.
Ces seconds pères, dans les familles,	The second fathers, in families,
sont souvent plus paternels	are often more fatherly
que les pères véritables,	than the real fathers,
et ils ont plus de faiblesse	and they have more indulgence
pour les enfants de la maison,	for the children of the house,
parce qu'ils se défient	because they mistrust
moins de leur amour	their love less,
et qu'ils aiment par choix	and because they love from choice
et non par devoir.	and not from a feeling of duty.
Tel paraît avoir été	Such appears to have been
l'oncle de Jeanne,	Joan's uncle,
le père de prédilection,	the father of her choice (love),
le consolateur, le confident,	her comforter, her confidant,
puis enfin l'intermédiaire	then finally her mediator
séduit par son cœur	overcome by his love
entre sa nièce et le ciel.	between his niece and heaven.
Pour soustraire Jeanne	To protect Joan
aux obsessions et aux reproches	against the importunate remonstrances and reproaches
de son père et de ses frères,	of her father and brothers,
l'oncle la prit quelque temps	her uncle took her for some time
chez lui, sous prétexte de soigner	to his home, under the pretence of taking care of
sa femme alitée.	his bedridden wife.
Jeanne profita de ce court séjour	Joan profited by this short stay
loin des yeux de ses parents	far from the eyes of her parents
pour obéir à ce qui lui commandait	to obey that which commanded her
dans l'âme.	in her soul.
Elle pria son oncle	She begged her uncle
d'aller à Vaucouleurs,	to go to Vaucouleurs,
ville de guerre, voisine de Domremy,	a garrison town, near to Domremy,
et de réclamer l'intervention	and to claim (demand) the intervention (mediation)
du sire de Baudricourt,	of the Lord of Baudricourt,
commandant de la ville,	commandant of the town,
pour qu'elle pût accomplir sa mission.	in order that she might fulfil her mission.
L'oncle, séduit par sa nièce	The uncle, won over by his niece
et sans doute poussé par sa femme,	and doubtless urged on by his wife,
se rendit avec simplicité à leurs désirs.	good-naturedly yielded to their wishes.
Il alla à Vaucouleurs	He went to Vaucouleurs
et rendit au sire de Baudricourt	and delivered to the Lord of Baudricourt
le message dont	the message of which
il s'était complaisamment chargé.	he had so kindly taken charge.
L'homme de guerre écouta	The officer in question listened
avec une indulgente dérision le paysan ;	with indulgent scorn to the peasant :
il semblait	it seemed to him

qu'il n'y eût qu'à sourire,	that there was nothing to do but smile,
en effet, de la démence	in fact, at the madness
d'une paysanne de dix-sept ans	of a peasant girl of 17 years of age
s'offrant à accomplir pour le Dauphin	who offered herself to accomplish for the Dauphin
et pour le royaume	and for his kingdom
ce que des milliers de chevaliers,	what thousands of cavaliers,
de politiques et d'hommes d'armes	of politicians and soldiers
ne pouvaient faire	could not effect
par la force du génie et des bras.	by the force of genius and of arms.
'Vous n'avez autre chose à faire,	'You have nothing else to do,
dit Baudricourt au messager	said Baudricourt to the messenger
des miracles en le congédiant,	with the miracles as he dismissed him,
que de renvoyer votre nièce,	than to send back your niece,
bien souffletée, chez son père.'	after having well chastised her, home to her father.'
L'oncle revint, convaincu	The uncle returned, convinced
sans doute par l'incrédulité	no doubt by Baudricourt's
de Baudricourt et résolu	want of belief and resolved
d'enlever pour jamais cette illusion	to do away for ever with this illusion
de l'esprit des femmes.	in the minds of women.
Mais Jeanne avait tant d'empire	But Joan had so much influence
sur lui, et la conviction	over him, and his firm faith
la rendait si éloquente,	made her so eloquent,
qu'elle reconquit promptement	that she quickly regained
la foi perdue de son oncle	the lost faith of her uncle,
et qu'elle lui persuada	and that she persuaded him
de la mener lui-même à Vaucouleurs,	to take her to Vaucouleurs,
à l'insu de ses parents.	unknown to her parents.
Elle sentait bien que c'était	She felt plainly that it was
le pas décisif	the decisive step
et qu'une fois hors du village	and that once out of the village
elle n'y rentrerait jamais.	she would never again re-enter it.
Elle fit confidence de son départ	She confided her departure
à une jeune fille	to a young girl
qu'elle aimait tendrement,	whom she tenderly loved,
nommée Mangète, et elle pria avec elle	called Mangete, and she prayed with her
en la recommandant à Dieu.	while committing her into the hands of God.
Elle cacha son dessein à celle	She concealed her design from her
qu'elle aimait encore davantage	whom she loved still more dearly
et qui s'appelait Haumette,	and who was called Haumette,
'craignant, dit-elle après,	'fearing, said she afterwards,
de ne pouvoir vaincre sa douleur	her inability to overcome her grief
de la quitter	on leaving her
si elle lui disait adieu ;	if she bade her adieu ;
elle pleura beaucoup en secret	she wept much in secret
et vainquit ses larmes.'	and conquered her tears.'

XV.

Vêtue d'une robe de drap rouge,	Dressed in a red cloth gown,
selon le costume des paysannes	according to the customs of the peasants
de la contrée, Jeanne partit	of her country, Joan set off
à pied avec son oncle.	on foot with her uncle.
Arrivée à Vaucouleurs,	On arriving at Vaucouleurs,
elle reçut l'hospitalité	she was hospitably entertained
chez la femme d'un charron,	by the wife of a wheelwright,
cousin de sa mére.	her mother's cousin.
Baudricourt, vaincu par l'insistance	Baudricourt, overcome by the importunities
de l'oncle et par l'obstination	of the uncle and by the persistency
de la nièce, consentit à la recevoir,	of his niece, consented to receive her,
non par crédulité mais par lassitude.	not from belief but out of weariness.
Il fut ému de la beauté	He was touched by the beauty
de cette jeune paysanne,	of this young peasant girl,
que son chevalier Daulon	whom his captain Daulon
dépeint en ces termes	describes in these words
vers cette époque :	about this period :
'Elle était jeune fille,	'She was a young girl,
belle et bien formée,	beautiful and well formed,'
dit-il en décrivant chastement	said he, while describing chastely
jusqu'aux grâces de la femme.'	even the very charms of the woman.
Baudricourt l'ayant interrogée,	Baudricourt, having interrogated her,
Jeanne lui dit avec un accent	Joan spoke to him in a tone
de fermeté modeste	of modest firmness
qui prenait son autorité	which derived its authority
non en elle-même,	not from herself,
mais dans ce qui	but from what
lui avait été inspiré d'en haut :	had been inspired into her from on high :
'Je viens à vous	'I come to you
au nom de Dieu, mon Seigneur,	in the name of God, my Master,
afin que vous mandiez au Dauphin	in order that you should send word to the Dauphin
de se bien tenir où il est,	to be on his guard where he is,
de ne point offrir de bataille	not to offer battle
aux ennemis en ce moment,	to the enemy at the present time,
parce que Dieu lui donnera	because God will send him
secours dans la mi-carême.	succour in Lent.
Le royaume, ajouta-t-elle,	The kingdom, continued she,
ne lui appartient pas,	does not belong to him (the Dauphin),
mais à Dieu, son Seigneur.	but to God, his Master.
Toutefois il lui destine le royaume ;	Nevertheless, God destines the kingdom for him ;
malgré les ennemis, il sera roi,	in spite of his enemies, the Dauphin will be king,
et c'est moi	and it is I
qui le mènerai sacrer à Reims !'	who will conduct him to be crowned at Rheims !'

Grammatical Notes, Questions, Sentences, and Pieces for Translation to Jeanne d'Arc.

CHAPTER XII.

Causer, to talk ; causeur, talker ; causerie, pleasant conversation ; causeuse, a settee ; causette, a chat. Le mal = evil. Distractions = change of thought and thoughtlessness. *Rude* does not mean *rude*, but *hard*. *Dur* = hard, rough. Impoli = uncivil, rude. *Créance* = credence, credit, debt owing to the *créancier*, creditor ; *le débiteur* owes *une dette*, a debt. Et *qu*'elle se melât (*que* put for *si* takes subj.).

CHAPTER XIII.

Bien **added to a *verb* intensifies its meaning.**

CHAPTER XIV.

Se défier *de* (to mistrust), but se fier *à* (to trust). L'Esprit consolateur or Le consolateur, the Holy Ghost. Se soustraire *à* (= to save or escape from); se soustraire *de* (= to abstract from). Commander quelque chose *à* quelque (hence *lui* commandait), Voisin is both noun and adj. The scriptural '*thy neighbour*' = ton prochain (invariable). Rendre = to give back; se rendre = to yield or betake oneself. La politique = policy; le politique = politician. Note: à mon (ton, son, notre, votre, leur) insu = without my (thy, his, our, your, their) knowledge. Au vu et au su de = with the full knowledge of. Elle cacha son dessein à (cacher always takes à = from; but *se* cacher *de*). Dessein = plan; dessin = drawing.

CHAPTER XV.

Mi = half; middle; mid. A mi — côte = half-way up (the hill). En référer à = to submit the case to. *Le curé* is the priest in charge, *i.e.*, the rector, vicar, incumbent, but *le vicaire* is the *curate* of *le curé*.

(To be continued.)

Our Certificate Class.

BY DR. GEORGE BEACH, M.A.

Head Master of Christ Church School, Macclesfield.

GEOGRAPHY.

General Remarks.—Geography, as ordinarily studied, is of little use for the purposes of intellectual training, appealing (as it does) almost entirely to one of the lowest mental faculties, the memory. John Stuart Mill says, 'It has always seemed to me a great absurdity that History and Geography should be taught in schools, except in the elementary ones for the children of the labouring classes, whose subsequent access to books is limited.'

Notwithstanding, more than any other people, Englishmen, as a commercial and colonising nation, require for utilitarian purposes a sound and somewhat extensive knowledge of geographical facts; and now that the franchise is extended to the masses, whose suffrages decide measures involving the welfare or disaster of millions subject to them (every Englishman rules ten Hindoos), it is incumbent upon this Imperial race, whose pro-consuls rule immense territories, to have within easy reach the materials for forming at least approximately correct judgments.

Taking this view, it is just and wise of the Department to insist so strenuously, and dwell so perpetually, upon the geography of our Empire. Knowledge should begin at home.

The questions propounded offer, also, an exceedingly ample choice, are as a rule very fair ones, and a considerable proportion are such as an intelligent voter could say *something* about. After a close scrutiny of about five hundred questions we calculate that female students can secure forty per cent., and male students twenty-five per cent. (even including Physical Geography) of the maximum number of marks, by a thorough acquaintance with the geography of Hindostan; and the recent extension of 'Further India' by the annexation of Burmah will certainly tend to maintain this high per centage. After an exhaustive analysis of the aforesaid five hundred questions, we fail to discover any classification that would really be of practical use to us; but, speaking generally, the following points seem the favourites, and are touched upon nearly every year. Almost every paper contains a historical question, Notes of lesson, 'where and what' question, and queries upon railways, government, races, and productions; lists of our possessions too are very frequently demanded.

As to Method of Study.—The map should be ever under the eye, and no information should be read without the bodily or mental vision viewing the associated district.

Let our students strive to cultivate what we will call (for lack of a better name) imaginative or associative memory. We ourselves (and we know many other instances) having forgotten a fact, can frequently picture before us the requisite page or map, and re-read the desired information. The eminent blindfold chess-player, Mr. Blackburne, has told us that this is his *modus videndi et ludendi et vincendi.*

We do NOT recommend the traditional method, still applicable to some subjects, and so often insisted upon, of making one's own abstract of geographical information. There being so many serviceable epitomes published, and even the larger geographies denoting the salient features by large type, it is simply waste of time.

The student can, by reading only, digest at least five pages, whilst compiling a written synopsis of one, and by his own freely made marks in the margin of the manual, can distinguish what he considers essential, where his own views differ from the compilers, or where the necessities of this examination demand. This abstract-making was 'all very well' in the days of antiquated, unsuitable and inferior compilations, but philanthropic publishers and litterateurs have happily freed the student of 1888 from much, though not the whole, of this drudgery.

When once the primary features of a country are known, the Physical Geography, studied conjointly, should enormously assist with its associative and deductive aid.

Sometimes the candidate is *required* and sometimes *advised* to answer specified questions. Let both the command and the counsel be considered equally imperative.

Map-drawing can scarcely have its importance exaggerated. One question, at least, is always, and oftentimes several, devoted to it. In the Syllabus itself, for females, it is placed in the foreground. To show the prevailing tendency it will be merely sufficient to reproduce 'my Lords' *ipsa verba*, which may vary year by year.

(1) 'Candidates must draw one map.' (2) 'One map at least should be attempted.' (3) 'Map-drawing, if well done, will obtain a large number of marks.' (4) 'Illustrate by small sketch maps and diagrams.' (5) 'Small sketch maps or diagrams may be drawn to illustrate any answer, at the candidate's discretion.' (6) 'Every map should be drawn on a scale sufficiently large to occupy all the blank space available. If the candidate put in and correctly number the lines of latitude and longitude, it will add to the value of the exercise. Places, &c., must not be indicated by letters or figures, referring to a list of names at the side, but the names themselves must be inserted in the map.'

A red and blue lead, wherewith to colour his map, should be taken into the Examination by every candidate. This process of colouring, occupying but a short time, will certainly not metamorphize a bad map into a good one, but will considerably enhance the value of the latter.

Despite all contrary canons, we must here, for once, dogmatize (and the same principle applies to embellishing needlework), for we speak that we do KNOW. Do not forget to practise maps of rivers and seas.

Physical Geography is required only from male examinees, but the questions sometimes assume that females have assimilated its information and principles in their first year course.

Very easy is our task under this head, for the Syllabus details the particulars required, and the Department cling very closely, in the questions set, to their formulated programme.

On all the six enumerated divisions, a question will probably be asked, and perhaps any three will be ordered to be answered, whilst four other queries may be upon the remainder of the course.

Highly profitable, therefore, will it be to study attentively Physical Geography, not only on account of its intrinsic importance, but also for the aid it lends to the intelligent grasp (and therefore remembrance) of the other branches of Geography. Any male student in training, or acting teacher, who has not passed the Geography of the First Year with credit, who has failed altogether, or who has not been examined on First Year Papers, must take up the First Year Geography, even if going in for Second Year Papers.

The foregoing regulation, which also applies to History and the arrangement of the Certificate curriculum into six groups, was introduced for the Examination at Christmas, 1886.

Physical Geography, properly so called (as distinguished from the Geography of physical features) first appeared at Christmas, 1887.

HISTORY.

The superficial resemblance between Geography and History is very striking, and many of our remarks about the former, as regards its general character, its text books, and its methods of study, are equally applicable to the latter.

Moreover, History, apart from Geography, cannot be properly understood. The Department, therefore, has very properly placed them in the same group, and under the same regulations, and has justly appraised their elementary value, by requiring them only from new examinees, or unsuccessful candidates on the First Year Papers.

History, which consists merely of the acquisition of facts, and is not deductive and comparative, is of merely antiquarian value, and this lower level is all that can be aimed at under present conditions.

But 'History repeats itself,' and when its cycles are understood, when of its phenomena the causes and effects are duly observed and correlated, so that the teaching of the past instructs us as to the problems of the present, or near future, then its value is practically and superlatively high.

This ideal we cannot now even aspire to, although to every influential citizen it is an essential, unless he desire to be a political charlatan.

Although the males and females have different 'periods' to study, it will be found that the questions given to both sexes are drawn up on the same lines. The males may advantageously work according to the five sub-divisions laid down for the guidance of the females, paying also particular attention to—A, Lives of eminent men; B, Detailed accounts (with plan) of great battles; and C, The most important dates.

Judging from past questions and present events, we advise special attention to be also given to the Growth of Education—Development of Liberty of the Press—Parliamentary Representation—Privileges of Members of Parliament—Composition of the Cabinet—National Debt—The Constitutional ties uniting the various parts of the British Isles—History of Local Government—Relation of Imperial and Colonial Governments—History of Ireland, Hindostan and South Africa—The Tithe Question—and the Growth of Navy and Army, carefully noting the history and present condition of our auxiliary forces. For the last two years, the candidate has only been called upon to answer about 50 per cent. of the given questions, and as these have been within the syllabus, and of a reasonable character, no complaint lies under this 'head.'

The syllabus for females is the same as last year's. They will probably be allowed three hours, and the males two-and-a-half hours for answering.

We recommend our students—I. To make themselves complete masters of a rather scanty general historical outline; II. To study each of the given divisions separately; III. To study each period or reign by itself; IV. To learn thoroughly the most important dates. This method will most assist the memory. It binds the facts together with the ties, both of contemporaneity and sequence, and is analogous to testing registers by addition of horizontal and vertical columns. The dates too will associate the events.

Some people cannot remember dates. For these, and none other, we recommend some system of MEMORIA TECHNICA. (*See below.*)

The average male student will probably require to make an abstract of 'McCarthy.' McLeod's 'Constitutional History' should be used.

At the request of numerous correspondents we append an account of 'The Cabinet' from the pen of Mr. Gladstone.

'THE CABINET.'

(*Inserted by special request.*)

'1. *Relations of the Cabinet to* (*a*) *the Crown, and* (*b*) *the Parliament.*

'Upon the Cabinet it devolves to provide that the Houses of Parliament shall loyally counsel and serve the Crown, and that the Crown shall act strictly in accordance with its obligations to the nation. In the face of the nation, the Sovereign and the Ministers are an absolute unity. The one may concede to the other; but the limit of concession by the Sovereign is at the point when he becomes willing to change his Government—by the Ministers when they become unwilling to bear the responsibility of all that is done in the Crown's name.

'But the Cabinet has also relations with "the Lords," which need not however be one of entire unity, for their votes cannot doom it to capital punishment. On the confidence of the Commons it is immediately and vitally dependent.

'2. *Threefold* (*or fourfold*) *capacities of Cabinet Ministers.*

'Every Minister acts in three capacities: (*a*) as administrator of a department; (*b*) as a member of Parliament; (*c*) and as a confidential adviser of the Crown. Two Ministers possess a fourth capacity, viz., that of leaders of the Lords and Commons. These suggest and fix the course of business, take the initiative in ceremonial procedure, and advise the Houses in any difficulty.

'3. *Internal relations of the Cabinet.*

'The Cabinet is an unity, and no member in his single capacity can advise the Crown, and therefore it is a prime office of discretion for each Minister to settle what are the departmental acts in which he can presume his colleagues' consent, and in what more delicate, weighty or peculiar cases he must positively ascertain it.

'4. *The Premier.*

'The Premier has no power over his colleagues; he has no title to override them in their departments; his vote counts only as one of theirs; he governs them by influence only. But they are appointed or dismissed by the Sovereign on his advice, and any weighty business would commonly go to him, before being submitted to the Cabinet. He has many audiences with, and reports to, the Sovereign its proceeding. He is in these bound not to counterwork the Cabinet, nor to undermine the position of his colleagues in the royal favour. As the Cabinet stands between the Sovereign and Parliament, so he stands between the Sovereign and his colleagues.

'As a rule the Premier's resignation dissolves the Cabinet, but the defection of any other member only creates a vacancy, except when the balance of forces is exceeding delicate.'—(*Adapted from an article by Mr. Gladstone.*)

ANSWERS TO CORRESPONDENTS.

We shall be pleased to reply briefly, and through this column, to any seeking information or advice.

Answers demanding urgency will be promptly forwarded per post on receipt of stamped and addressed envelope.

A. W., West Vale, Halifax; H. M., Dunkinfield; C. M., Bodmin; answered per ordinary letter.

Historicus and others will find their wishes met in this month's articles.

MEMORIA TECHNICA.

Figure.	0	1	2	3	4	5	6	7	8	9
Substituted vowel.	y	a (1st vowel)	e (2nd vowel)	i (3rd vowel)	o (4th vowel)	u (5th vowel)	au (1 + 5)	oi (4 + 3)	oo (4 + 4)	ou (4 + 5)
Substituted consonant.	r (Round)	b (1st consonant)	d (Duo)	t (Three)	f (Four)	l (L = fifty)	s (Six)	p (SePtem)	k (OKto)	n (Novem)

Examples.

Battle of Minden, 1759 (759) = Mindpun ('p' = 7, 'u' = 5, 'n' = 9).
Mutinies at Spithead and the Nore, 1797 (797) = Spitnorpoup ('p' = 7, 'ou' = 9, 'p' 7).
Battle of Waterloo, 1815 (815) = Water-kal ('k' = 8, 'a' = 1, 'l' = 5).
Reform Bill, 1832 (832) = Reforkid ('k' = 8, 'i' = 3, 'd' = 2).

These Mnemonics when once learned are never forgotten.

The thousand figure is not required, as no confusion can arise from its omission.

ROUTINE FOR AUGUST. (MALES.)

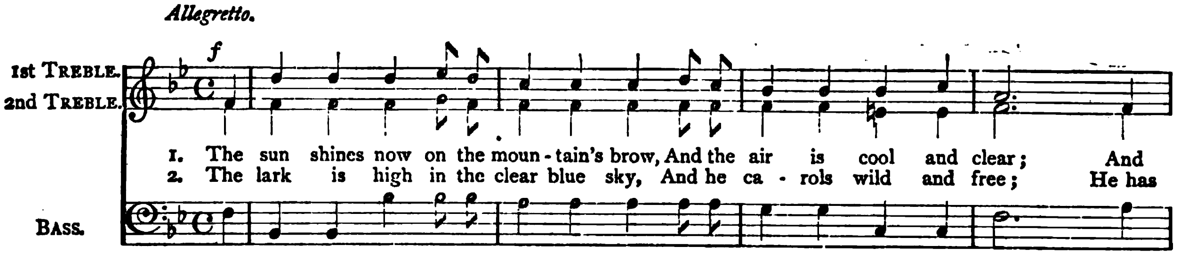
<table>
<tr><th>DAY</th><th colspan="12">FIRST WEEK</th><th colspan="12">SECOND WEEK</th><th colspan="12">THIRD WEEK</th><th colspan="12">FOURTH WEEK</th></tr>
<tr><td>MONDAY</td><td colspan="4">What provision would you make for training a 1st and 4th Year P.T. in the art of Teaching?</td><td colspan="4">The algebraic proofs of the twelve 'Theorems' of Euclid, Book II.</td><td colspan="4">Paraphrase Lines 92—107 of Cæsar, Act V. Scene 1</td><td colspan="4">Deductions 199—210 of Egan, Part II.</td><td colspan="4">Paraphrase Comus, Lines 153—169</td><td colspan="4">All geography of England</td><td colspan="4">Compare Milton and Dante (Macaulay)</td><td colspan="4">Map of West Indies</td><td colspan="4">History — Twenty-third chapter of McCarthy</td><td colspan="4">Within what limits can the Teacher influence Habit and Character?</td><td colspan="4">Deductions 234—248 of Egan, Part II.</td><td colspan="4">Study the Adjective, Conjunction and Interjection</td></tr>
<tr><td>TUESDAY</td><td colspan="4">Geography of our West Indian Possessions</td><td colspan="4">Arithmetic or Algebra</td><td colspan="4">Outlines of History, to end of Elizabeth's reign</td><td colspan="4">Arithmetic or Mensuration</td><td colspan="4">History — Twenty-second chapter of McCarthy</td><td colspan="4">Notes of a First Lesson on Algebra</td><td colspan="4">Study the Adjective, Conjunction and Interjection</td><td colspan="4">Revise Algebra</td><td colspan="4">Wars with Wales and Scotland</td><td colspan="4">Revise Euclid, Book IV.</td><td colspan="4">Revise Notes of Comus</td><td colspan="4">School Management. — Headaches, The Eyes, pp. 287—310 (Carpenter's Hygiene)</td></tr>
<tr><td>WEDNESDAY</td><td colspan="4">The Binomial Theorem</td><td colspan="4">The rules of the ordinary 'Syllogism' (Jevon's Logic Primer)</td><td colspan="4">Deductions 388—40 of Egan, Part I.</td><td colspan="4">The Binomial Theorem</td><td colspan="4">Revise Euclid, Book II.</td><td colspan="4">Write 30 lines of Composition upon the character of Octavius</td><td colspan="4">Deductions 222—233 of Egan, Part II.</td><td colspan="4">Paraphrase (about p. 14 of Essay on Milton) 'Of these principles then struggling for their infant existence...... as in the long run it always is with its enemies.'</td><td colspan="4">Geography — Revise— The causes and effects of climate</td><td colspan="4">Geography of Ceylon and Van Diemen's Land</td><td colspan="4">Arithmetic or Algebra</td><td colspan="4">History — Revise McCarthy</td></tr>
<tr><td>THURSDAY</td><td colspan="4">Write 30 lines of Composition upon the Character of Antony</td><td colspan="4">Write a Large-hand copy of the word 'Crystallization,' and 30 lines of the Small-hand copy 'Gray-eyed morn smiles on the frowning night'</td><td colspan="4">Revise Euclid, Book I.</td><td colspan="4">Geography of our West African Possessions</td><td colspan="4">Arithmetic or Mensuration</td><td colspan="4">Tables of Stuart and Hanoverian Dynasties</td><td colspan="4">Arithmetic or Mensuration</td><td colspan="4">History — Twenty-fourth chapter of McCarthy</td><td colspan="4">Revise Algebra</td><td colspan="4">Notes of Cæsar to end</td><td colspan="4">Arithmetic or Algebra</td><td colspan="4">Notes of Lesson on the Solar System</td></tr>
<tr><td>FRIDAY</td><td colspan="4">Notes of Cæsar to end of Act V. Scene 5</td><td colspan="4">The variations or irregularities of the Earth's motions</td><td colspan="4">Arithmetic or Algebra</td><td colspan="4">The Binomial Theorem</td><td colspan="4">Canon Warburton's Article in our July issue on Pestalozzi</td><td colspan="4">Deductions 211—221 of Egan, Part II.</td><td colspan="4">Geography — Revise— Distribution of plants & animals</td><td colspan="4">Revise the last eighteen Propositions of Euclid. Book III.</td><td colspan="4">Write an essay upon Macaulay's position among English Authors</td><td colspan="4">Deductions 249—259 of Egan, Part II.</td><td colspan="4">Read carefully through the last half of the Essay on Milton</td><td colspan="4">Geography of New Zealand</td></tr>
<tr><td>SATURDAY</td><td colspan="3">Important Dates to end of Elizabeth</td><td colspan="3">Notes of Cæsar to end of Act V. Scene 5</td><td colspan="3">The Binomial Theorem</td><td colspan="3">Ventilation (To p. 104 of Carpenter's Hygiene)</td><td colspan="3">Revise Notes of Comus</td><td colspan="3">The Log Book, The Half-Time, Attendance, Summary, and Admission Registers</td><td colspan="3">Revise the first nineteen Propositions of Euclid, Book III.</td><td colspan="3">Arithmetic or Algebra</td><td colspan="3">Revise Geography of Australasia</td><td colspan="3">Arithmetic or Mensuration</td><td colspan="3">Outlines of History to end of Charles II. reign</td><td colspan="3">Revise Algebra</td><td colspan="3">Arithmetic or Mensuration</td><td colspan="3">Important Dates to end of Charles II.</td><td colspan="3">Algebra — Logarithms</td><td colspan="3">Write out (for future use) a Summary of Canon Warburton's last Article on Pestalozzi</td></tr>
</table>

ROUTINE FOR AUGUST. (FEMALES.)

DAY	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
MONDAY	What provision would you make for training a 1st and 4th year P. T. in the art of Teaching?	Analyse, and Parse difficult words of Cæsar, Act V. Scene 3, Lines 33 to 46	Geography of our West Indian Possessions	Our Spanish Wars during the 18th Century	Revise any Arithmetic	Geography of South American Possessions	The ordinary poisons with their antidotes	The rules of the ordinary 'Syllogism' (Jevon's Logic Primer)	Map of West African Possessions	Revise any Arithmetic	Geography of West African Possessions	Write 30 lines of Composition upon 'The character of Cassius'
TUESDAY	Pitt's India Bill of 1784. Union with Ireland, 1800. Pitt's creation of Peers	Exercises in Mental Arithmetic	Paraphrase Lines 92 to 107 of Cæsar, Act V. Scene 1	Map of British Isles	Family of father, mother, and 4 children. Income 30/- per week. In what proportions should it be expended for Rent, Dress, Food, Education and Providence?	Practise Stocking-web stitch, Swiss-darning a hole, and Plain darn on linen	Ventilation (To page 86 of Carpenter's Hygiene)	Revise any Arithmetic	Revise any Geography	Outlines of History from 1783 to 1792	What are the requirements of the 3rd Stage of the Specific Subject, 'Domestic Economy'?	Practise any cutting-out wherein you are most deficient
WEDNESDAY	What are the requirements of the 2nd Stage of the specific subject 'Domestic Economy'?	Notes of Lesson on 'Housework'	Needlework — Practise any diagrams wherein you may be most deficient	Life of Adam Smith. Canals, 1761. Steam Engine, 1765	Arithmetic — Problems where the difference between the Principal and the Present Worth is given	Syntax of Adverbs and Prepositions	Revise any Geography of the British Isles	The changes effected in food by cooking. The ills attending bad cooking	Canon Warburton's Article in our June issue on Pestalozzi	Compare Addison's humour with that of Swift and Voltaire	Practise Hedge-tear and Cross-cut darns	The Log Book, the Half-time, Attendance, Summary and Admission Registers
THURSDAY	Map of West Indies	Needlework — Feather stitching, Herring-boning, and Knotting	Arithmetic — Any Stocks	School Managmt. — Headaches, the Eyes, pp. 287—310 (Carpenter's Hygiene)	Discuss the question whether 'The French cook more economically than the English'	Lives and works of Newton, De Foe, Swift, Richardson, and Fielding	Analyse, and Parse difficult words of Cæsar, Act V. Scene 3, lines 93 to 110	History during 18th Century of Nova Scotia, New Brunswick, Prince Edward Isle, Vancouver Island	Problems on Least Common Multiple, *e.g.*, bells tolling at different given rates—to find when they will synchronise	The various religions of the peoples of our Empire	In what cases, and how, should Heat be used as a curative agent?	Explain the principle of 'The Unitary Method'
FRIDAY	Describe the different methods of ironing. To what articles are they applicable? How would you guard against scorching?	$\frac{1}{3}$ of a pole is in the mud, $\frac{1}{4}$ of a pole is in the water, 2 feet above water, find length of pole. Similar problems	Settlement of New South Wales, 1788. — Malta	Paraphrase Lines 68 to 81 of Cæsar Act V. Scene 5.	Cut out and tack together the sleeve of a boy's shirt, and set on wristband	Notes of Lesson on The Solar System	Explain the principles, working, and advantages of Co-operative Stores	Write 30 lines of Composition upon 'The character of Brutus'	Needlework — Plain	What is the range of the Teacher's influence as regards 'Habit' and 'Character'?	The persons alluded to in the Essay on Addison	Outlines of History from 1792 to 1801

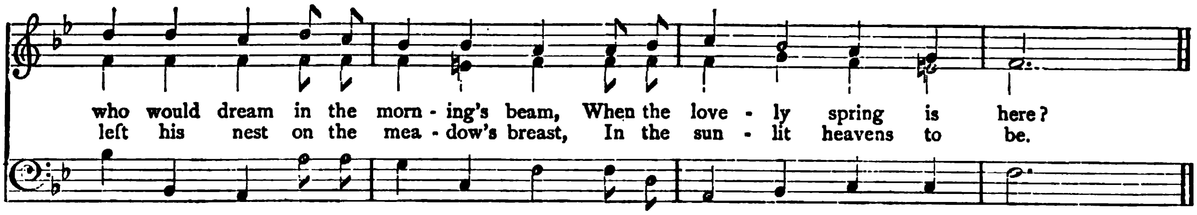
DAY	FIRST WEEK				SECOND WEEK				THIRD WEEK				FOURTH WEEK			
SATURDAY	What is Macaulay's opinion of Addison's genius and attainments?	Treaties of Utrecht and Aix-la-Chapelle	Geography of our West Indian Possessions	Write a Large-hand copy of the word 'Crystallization' and 30 lines of the Small-hand copy 'Grey-eyed morn smiles on the frowning night'	Problems as to cost of painting or papering areas	Notes of Cæsar to end of Act V. Scene 5	Distinguish between contagion and infection, and classify ordinary diseases	Needlework — Plain	Practice Sums whose answers are in 'Weights or Measures'	Notes of Cæsar to end of Act V. Scene 5	Clock Sums — 1 Position of Hands. 2 True or denoted time	War of Austrian Succession	Syntax of Adverbs and Prepositions	Geography of Ceylon and Van Diemen's Land	Arithmetic — To reduce Sovereigns through (say) francs, gulden, etc., to dollars	Write out (for future use) a Summary of Canon Warburton's last article on Pestalozzi

THE PLOUGH.


Allegretto.
f
1st Treble.
2nd Treble.
Bass.
1. The sun shines now on the moun - tain's brow, And the air is cool and clear; And
2. The lark is high in the clear blue sky, And he ca - rols wild and free; He has

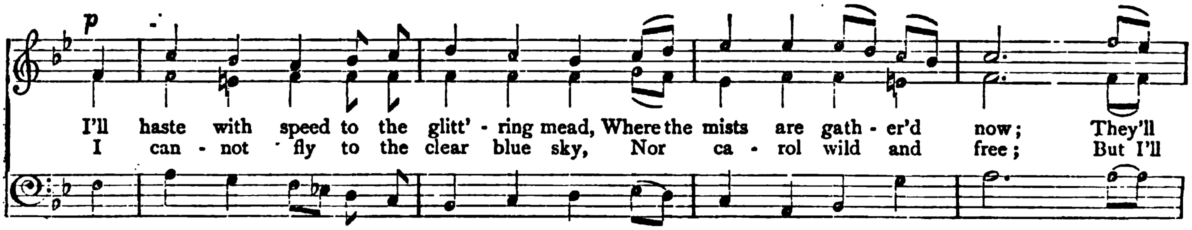
KEY B♭. *Allegretto.* ***f.***

1st TREBLE. :s_1 | m :m | m :f .m | r :r | r :m .r | d :d | d :r | t_1 :— | — :s_1
2nd TREBLE. :s_1 | s_1 :s_1 | s_1 :l_1 .s_1 | s_1 :s_1 | s_1 :s_1 .s_1 | s_1 :s_1 | fe_1 :fe_1 | s_1 :— | — :s_1
BASS. :s_1 | d_1 :d_1 | d :d .d | t_1 :t_1 | t_1 :t_1 .t_1 | l_1 :l_1 | r_1 :r_1 | s_1 :— | — :t_1


who would dream in the morn - ing's beam, When the love - ly spring is here?
left his nest on the mea - dow's breast, In the sun - lit heavens to be.

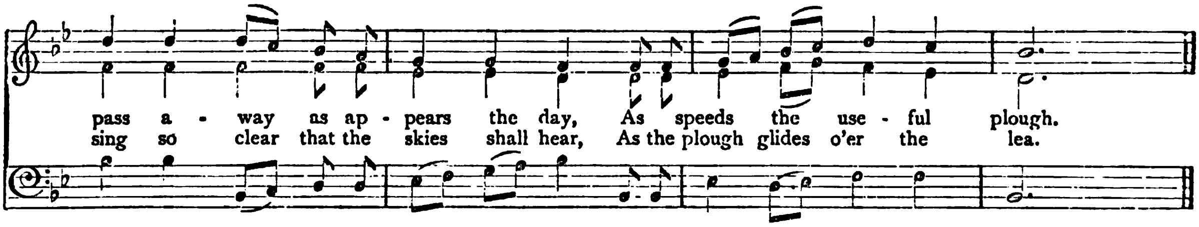
F.t.

m :m	r :m .r	^{d}f :f	m :m .f	s :f	m :r	d :—	—	
s_1 :s_1	s_1 :s_1 .s_1	^{s}'d :t_1	d :d .d	d :r	d :t_1	d :—	—	
d :d_1	t_2 :t_1 .t_1	^{l}'r :s_1	d :d .l_1	m_1 :f_1	s_1 :s_1	d :—	—	


p
I'll haste with speed to the glitt' - ring mead, Where the mists are gath - er'd now; They'll
I can - not fly to the clear blue sky, Nor ca - rol wild and free; But I'll

f.B♭. *p*

:$^{d}s_1$ | r :d | t_1 :d .r | m :r | d :r .m | f :f | f .m :r .d | r :— | — :s .f
:$^{d}s_1$ | s_1 :fe_1 | s_1 :s_1 .s_1 | s_1 :s_1 | s_1 :l_1 .s_1 | f_1 :s_1 | s_1 :fe_1 | s_1 :— | — :s_1 .s_1
:$^{d}s_1$ | t_1 :l_1 | s_1 .f_1 :m_1 .r_1 | d_1 :r_1 | m_1 :f_1 .m_1 | r_1 :t_2 | d_1 :l_1 | t_1 :— | — :t_1 .t_1

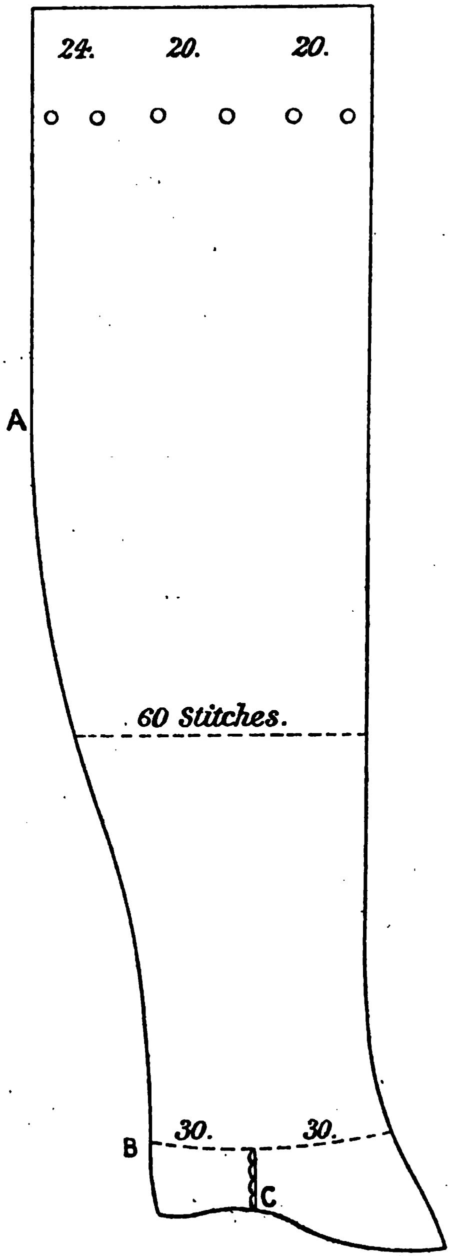

pass a - way as ap - pears the day, As speeds the use - ful plough.
sing so clear that the skies shall hear, As the plough glides o'er the lea.

m :m	m .r :d .t_1	l_1 :l_1	s_1 :s_1 .s_1	l_1 .t_1 :d .r	m :r	d :— :—	
s_1 :s_1	s_1 :s_1 .s_1	f_1 :f_1	m_1 :m_1 .m_1	f_1 :s_1 .l_1	s_1 :f_1	m_1 :— :—	
d :d	d_1 .r_1 :m_1 .m_1	f_1 .s_1 :l_1 .t_1	d :d_1 .d_1	f_1 :m_1 .f_1	s_1 :s_1	d_1 :— :—	

Knitting Maps.

BY MRS. J. D. HARRIS.

Gaiter for Infant.



3 oz. Andalusian wool.

4 pins. No. 15 Chamber's bell gauge.

Cast on 64 stitches. 24, 20, 20.

Knit 1, purl 1, for 1 inch.

Make a row of holes by putting the wool forward and knitting 2 together.

Rib the rest of the leg, viz., knit 2, purl 2.

A. When you have knitted 4 inches decrease for calf in the centre of the pin with 24 stitches.

Decrease 4 times, with 6 rounds between each decreasing.

Knit the leg 10½ inches long.

To form the Heel.

B. Put 30 stitches on the back pin, 30 on the instep.

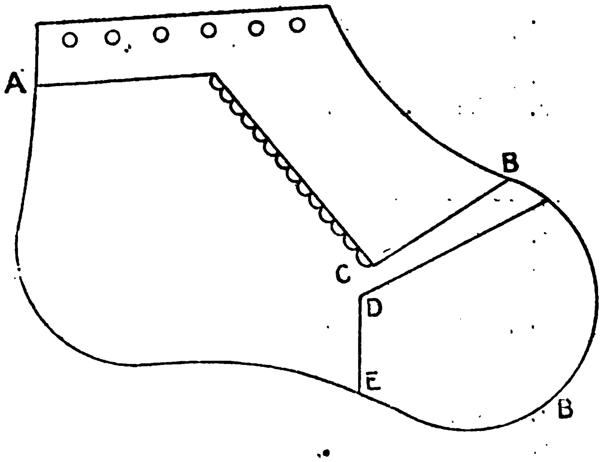
Knit 8 rows backwards and forwards on the heel pin. Cast off, and when you come to the end of the row pick up 4 loops, and rib round the instep, picking up 4 loops on the other side.

To form the Instep.

C. Knit the 2 first and 2 last of each succeeding row plain, and after the 2 first, and before the 2 last, decrease in every other row, by knitting 2 together. When reduced to 14 stitches, knit 2 plain rows, and cast off.

Put an elastic at the junction of the heel and instep, and a ribbon in the holes at the knee.

For little infants before they can walk many people prefer a gaiter with a foot to it, in which case the following pattern will be found to answer:—



When you have knitted to the ankle, make a row of holes.

A. Put 20 stitches on each side pin. 20 on instep. Rib about ½ an inch. Rib instep pin about 1½ inches more.

B. Knit 14 plain rows.

C. Pick up the side loops. Knit back, and pick up the corresponding loops on the other side. Knit 10 rows.

D. On the right side, when you come to the toe-pin, knit the first 2 and the last 2 stitches together. Knit to the end of the heel, and back to the other side. Also round the heel by knitting the 2 last stitches of each row together.

E. When the toe is reduced to 1 stitch knit the sole of the foot together and cast off. The pattern published August, 1887, answers admirably for the foot.

Quarterly Arithmetical Tests.

Standard I.—First Quarter.

1. $\begin{array}{r} 54 \\ 307 \\ 2 \\ 163 \\ \underline{81} \end{array}$

2. $\begin{array}{r} 693 \\ \underline{420} \end{array}$

3. $\begin{array}{r} 578 \\ \underline{36} \end{array}$

4. 11 × 2;
7 × 3;
4 × 8.

Second Quarter.

1. $\begin{array}{r} 628 \\ 50 \\ 419 \\ 7 \\ \underline{93} \end{array}$

2. $\begin{array}{r} 405 \\ \underline{261} \end{array}$

3. $\begin{array}{r} 734 \\ \underline{728} \end{array}$

4. 6 × 3;
5 × 10;
7 × 6.

Third Quarter.

1. $\begin{array}{r} 9 \\ 74 \\ 6 \\ 580 \\ \underline{735} \end{array}$

2. $\begin{array}{r} 347 \\ \underline{249} \end{array}$

3. $\begin{array}{r} 902 \\ \underline{5} \end{array}$

4. 4 × 12;
5 × 5;
6 × 9.

Standard II.—First Quarter.

1. 63 + 5,028 + 4 + 60,905 + 730 + 9,847.
2. Take 8,207 from 37,016.
3. 57,346 × 48.
4. 29d.; 47d.; 54d.

Second Quarter.

1. 15,395 ÷ 5. Write the answer in words.
2. 37,486 × 716.
3. How many nuts will be wanted to give 37 boys and 49 girls 9 each?
4. 75d.; 88d.; 94d.

Third Quarter.

1. 86,507 × 9,030.
2. Divide ten thousand eight hundred and seventy-nine by eleven.
3. In a school there are 12 classes and 38 boys in each class. How many boys are there in the school?
4. 107d.; 119d.; 136d.

Standard III.—First Quarter.

1. Divide 72,333 by 19.
2. How many times is 708 contained in four hundred and ninety-two thousand and sixty?
3. 318,500 ÷ 650.
4. Two boys visit an orchard and bring an equal number of apples. One goes 28 times and brings 45 each time. The other goes 35 times; how many apples does he bring each time?

Second Quarter.

1. Take £8 8s. 8¾d. from £52 13s. 7¼d.
2. If a man can ride 58 miles a day, how many days would it take him to travel ten thousand two hundred and eight miles?
3, £913 15s. 7½d. + £562 18s. 11¾d. + £308 16s. 9¼d. + £674 11s. 10½d. + £430 17s. 8d. + £159 14s. 6¾d.
4. A horse and a donkey each draw 3,780 paving-stones. The horse draws 70 paving stones each journey, and the donkey 60. How many more journeys will the donkey take than the horse?

Third Quarter.

1. What is the sum of five pounds thirteen shillings and four pence halfpenny, sixty-seven pounds eighteen shillings and five pence farthing, one hundred and eighty-three pounds twelve shillings and three pence, four thousand six hundred and two pounds seventeen shillings and a penny three farthings, thirty thousand and seventy-nine pounds eleven shillings and ten pence halfpenny, and two thousand and seven pounds sixteen shillings and seven pence farthing?
2. A boy had 3,040 nuts. He gave sixty-seven to each of his twenty-nine playfellows. How many had he left for himself?
3. What is the difference between six thousand and three pounds and half-a-crown and £798 10s. 7½d.?
4. Add together fifty guineas, thirty crowns, twenty half-crowns, and six hundred and ten pence.

Standard IV.—First Quarter.

1. Multiply 16s. 7¾d. by 380.
2. From four thousand pounds take £3 15s. 10¼d. × 796.
3. £10,067 13s. 11½d. ÷ 11.
4. If 287 articles cost £27,521 16s. 1¼d., what would be the price of one?

Second Quarter.

1. How many times is 17s. 9½d. contained in £272 4s. 3d.?
2. Reduce 3 qrs. 1 st. 13 lbs. to ounces.
3. A person's income is £78 per quarter, and he saves £1 5s. weekly. What does he spend yearly?
4. If a penny is 3 inches in circumference, how many times will it turn round on a path of 2 poles 2 yds. 2 ft.?

Third Quarter.

1. How many half-pints of beer are there in 69 gals. 3 qts. 1 pt.?
2. There are 567½ square yards in a garden. How many square feet are there in 10 such gardens?
3. If eggs are sold at 3 for 2d., how many can be bought for £29 13s. 6d.?
4. John Jones loses 5 minutes from school every morning and 10 minutes every afternoon. What time does he lose in 170 days?

Standard V.—First Quarter.

1. What is the cost of 7,935 articles at 9s. 5¾d. each?
2. Find, by practice, the rent of a farm of 159 ac. 3 ro. 28 po. at £2 5s. 10d. per acre.
3. What is the price of 879 articles at £80 18s. 10¾d. each?
4. Find the cost for 3 years 219 days at 50 guineas per annum (1 year = 365 days).

SECOND QUARTER.

1. If a man walk 10 miles in 2 hrs. 20 min., how far can he walk in 21 minutes?

2. If 28 yards of silk cost £8 3s. 4d., what quantity can be bought for £10 4s. 2d.?

3. Bill:—

6 yds. at 4s. 9d. per yd.;
$9\frac{1}{4}$ yds. at 3s. 10d. per yd.;
$10\frac{1}{2}$ yds. at 1s. 8d. per yard;
40 rods at 2s. 6d. per dozen;
$8\frac{3}{4}$ yds. at 4s. 2d. per yd.

4. If 15 tons 14 cwt. 2 qrs. of coal cost £10 9s. 8d., what must be paid for 39 tons 17 cwt. 3 qrs.?

THIRD QUARTER.

1. $\frac{1}{6} + \frac{7}{10} + \frac{3}{4} + \frac{2}{5}$.

2. Take $\frac{3}{8}$ from $\frac{5}{6}$, and add $\frac{2}{9}$ to the result.

3. A tradesman bought 2 tons 8 cwt. 3 qrs. 6 lbs. of rice for £99 12s.; how much must he charge per cwt. in order to clear £14 5s. 6d.?

4. If a man going a journey ride $\frac{1}{3}$ and walk $\frac{1}{8}$, what part is left?

STANDARD VI.—FIRST QUARTER.

1. Divide the product of ·721 and 10·89 by the difference between 954·68 and a thousand.

2. $3\frac{5}{16} - 1\frac{7}{12}$, and multiply the difference by $\frac{7}{\frac{3}{4}}$.

3. Simplify 14·0367 − ·097428 + ·1396 − 12·745.

4. Reduce to a mixed number—

$$\frac{2{\cdot}5 - {\cdot}25}{\cdot\dot{6}} + (3\tfrac{1}{2} \div 2\tfrac{1}{3}).$$

SECOND QUARTER.

1. If a grocer buy $8\frac{1}{2}$ cwt. of sugar at $2\frac{1}{2}$d. per lb., and sell £8 9s. 2d. worth at the same price, what part of a ton has he left?

2. If a room 7 yards long take 42 yards of carpet 27 inches wide, how many yards will it take when it is a yard wide?

3. 7·875 tons + 16·27 cwt. + ·92 qr. + 50 lbs.

4. A man left $\frac{1}{4}$ of his fortune to his first son, $\frac{1}{5}$ to his second son, $\frac{1}{6}$ to his daughter, and the remainder to his wife. The wife's share was £1,610. What was the amount left?

THIRD QUARTER.

1. Find the interest on £350 for 19 months at $3\frac{1}{4}$ per cent.

2. A man owes £780 15s., and possesses £149 12s. $10\frac{1}{2}$d.; what can he pay in the £?

3. If £470 be lent for $2\frac{3}{4}$ years at $4\frac{1}{4}$ per cent., what sum will be returned at the end of that time?

4. A can make a suit of clothes in 4 days, B in 6 days, and C in 8 days. How long would it take them working together?

STANDARD VII.—FIRST QUARTER.

1. Find the simple interest on £59 15s. for $4\frac{1}{2}$ years at £3 5s. per cent.

2. By investing £4,000 for 5 months £70 is gained; what will be gained by investing £5,000 for 11 months?

3. If the sum of £298 5s. be gained on £3,579, what is the gain per cent.?

4. If 26 men in 35 days do $\frac{7}{8}$ of their work, how long will it take them to do the whole of it, if they work an extra quarter day each day?

SECOND QUARTER.

1. Simplify:—$\dfrac{5{\cdot}2 \times {\cdot}6}{\frac{5}{8} - \frac{3}{10}} \div \dfrac{2{\cdot}5 \div {\cdot}08}{\frac{1}{6} + \frac{1}{3}}$.

2. What is the average of the following sums of money:—£$9\frac{5}{8}$, £$2{\cdot}\dot{6}$, 9s. 10d., £1·325, and $\frac{7}{8}$ of a shilling?

3. A man owns property worth £4,675, and insures it at the rate of ·125 per cent.; what is his net income?

4. A person rode $2\frac{1}{2}$ hours at 10 miles an hour; then went $3\frac{3}{4}$ hours at 8 miles an hour; and then went at the rate of 6 miles an hour for 15 minutes. Find his average speed per hour.

THIRD QUARTER.

1. There is a mixture of milk and water containing 15 gals. 3 qts. Of this $11\frac{1}{9}$ per cent. is water. Find the quantity of each.

2. A dealer buys three horses at £30, £60, and £80 respectively, and sells them at profits of 10, 15, and 20 per cent. What is his percentage of gain on the whole?

3. If 40 qrs. are sold at 34s. 6d. a qr., 60 qrs. at 36s. a qr., 30 qrs. at 37s. a qr., 20 qrs. at 38s. 6d. a qr., and 10 qrs. at 39s. a qr., what is the average price per qr.?

4. By selling 47 yards of silk at 7s. per yard, 12 per cent. is gained; what sum is gained on the whole?

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	607.	1,197.	1,404.
2.	273.	144.	98.
3.	542.	6.	897.
4.	22; 21; 32.	18; 50; 42.	48; 25; 54.

STANDARD II.

	FIRST.	SECOND.
1.	76,577.	3,079.
2.	28,809.	26,839,976.
3.	2,752,608.	774 nuts.
4.	2s. 5d.; 3s. 11d.; 4s. 6d.	6s. 3d.; 7s. 4d.; 7s. 10d.

THIRD.

1.	781,158,210.	3.	456 boys.
2.	989.	4.	8s. 11d.; 9s. 11d.; 11s. 4d.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	3,807.	£44 4s. $10\frac{1}{2}$d.	£36,947 9s. $8\frac{1}{4}$d.
2.	695 times.	176 days.	1,097 nuts.
3.	490.	£3,050 15s. $5\frac{3}{4}$d.	£5,204 11s. $10\frac{3}{4}$d.
4.	36 apples.	9 journeys.	£65 0s. 10d.

STANDARD IV.

	FIRST.	SECOND.
1.	£316 5s. 5d.	306 times.
2.	£981 0s. 1d.	1,776 oz.
3.	£915 4s. $10\frac{3}{4}$d. + 5.	£247.
4.	£95 17s. $10\frac{3}{4}$d.	164 times.

THIRD.

1.	1,118 hf.-pts.	3.	10,683 eggs.
2.	51,075 sq. ft.	4.	42 hrs. 30 min.

STANDARD V.—FIRST.

1. £3,760 17s. $2\frac{1}{4}$d.
2. £366 9s. $10\frac{3}{4}$d.
3. £71,150 9s. $5\frac{1}{4}$d.
4. £189.

SECOND.

1. $1\frac{1}{2}$ miles.
2. 35 yards.
3. £1 8s. 6d. + £1 15s. $5\frac{1}{2}$d. + 17s. 6d. + 8s. 4d. + £1 16s. $5\frac{1}{2}$d, = £6 6s. 3d.
4. £26 11s. 10d.

THIRD.

1. $2\frac{1}{60}$.
2. $\frac{49}{72}$.
3. £2 6s. 8d.
4. $\frac{11}{24}$.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	·17325.	$\frac{1}{18}$ ton.	£18 0s. $2\frac{1}{2}$d.
2.	$16\frac{5}{38}$.	$31\frac{1}{2}$ yds.	3s. 10d.
3.	1·333872.	8 tns. 14 cwt. 2 qrs. 2 lbs.	£528 3s. 3d.
4.	$4\frac{7}{8}$.	£4,200.	$2\frac{2}{11}$ days.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	£8 8s. $3\frac{11}{20}$d.	·1536.	milk 14 gals., water 1 gal. 3 qts.
2.	£192 10s.	£2 17s. $5\frac{3}{10}$d.	$16\frac{8}{17}$ per cent.
3.	$8\frac{1}{3}$ per cent.	£4,669 3s. $1\frac{1}{2}$d.	£1 16s. $3\frac{3}{4}$d.
4.	32 days.	$8\frac{9}{13}$ miles.	£1 15s. 3d.

Practical Needlework in Elementary Schools.

BY MISS J. W. WARREN,

Inspectress of Needlework to the Leicester School Board.

WE have now gone through the elementary exercises necessary to ensure the right holding of both needle and work, and are ready to begin to teach stitches. And here I pause to give advice about the materials. Several different methods have been tried from time to time with the same result that in the end props are discontinued, and the teacher returns to the ordinary materials, viz., plain white or unbleached calico and cotton. For the sake of those who prefer the help of props I would suggest one of three things—use for your first hemming the dotted calico, striped calico, or colored cottons with white or unbleached calico. Dotted calico can be bought for 6d. a yard at Moffatt and Paige's. The dots are so arranged as to enable a child to insert the needle at regular intervals, and by so doing get at once a *rightly-shaped stitch.* I have seen this tried in several schools, it is so far successful as to enable children at once to make stitches with very little supervision, but fails in that the help given by the dots prevents their exercising sufficient observation to get the same result when the transfer to ordinary calico takes place. The fixing is also a drawback, requiring very much attention and accuracy. Small country schools that are poorly staffed will, however, find it useful.

Striped calico is very useful, and has an advantage over dotted in that the fixing is without difficulties beyond those found in ordinary work, and can be bought at any draper's in the form of print, which should be washed before it is used. It will be at once seen that in using the striped calico no guide as to the height of stitch above and below the hem is given as in the dotted, only the regularity is ensured *laterally*; the shape of stitch, that is the direction in which to insert the needle, remains in the hands of the teacher.

We now come to the third, and, in my opinion, best help, viz., colored cottons on plain material. For whatever plan we try the end must come when the simple strip must be accomplished by each small child. A little rapidity in the beginning is bound to be sacrificed by the work on plain calico; but as the colored cottons are now a Code suggestion the child has absolutely nothing to unlearn. Even with all the good props suggested a bad or indifferent teacher will never succeed in teaching needlework thoroughly. With just a passing glance at the diagrams of these two calicoes we will pass on to the actual explanation of a stitch.

Plan.—Have ready pieces of coarse loose unbleached calico, 2 inches by 8 inches, fixed with a hem one-third of an inch wide. At least ten stitches of hemming should be done with a 6 needle and 36 black cotton, needle threaded and stuck ready for a stitch before giving to the child. Then place before each child a piece as above with a thimble.

Now let the thimbles be put on first. Of course drill for this is done with; but the work-placing, No. 6 drill, must be gone carefully through several times until the children can so place the work as to have the needle in exactly the right place upon the finger. (It will be remembered that it is placed ready for a stitch.) At this point a lesson in observation may be given. The child should be told to look at the needle, its point, its eye, its shaft, and, finally, the bit on the other side of the work, also the stitches already done; more can be done in this way to get the slope of stitch than in any other. Each child has a correct setting before it, and thus we approach as near to individual help as we possibly can. Having gone through this observation the needle may be grasped, as taught in combination drill, arranged with cotton in place, and the needle drawn slowly backwards (not through to the left). Notice that small holes are seen where it stood so long; these will serve for the first stitch setting. The needle should now be held up for inspection, and the command to put it in again exactly where it came from will give the slope at first without more trouble, this to be drawn out and repeated several times without altering needle in right hand, until understood. Then the directions in Sheet III., Stitch-drill 7, may be gone through; in this drill for hemming stitch children should be taught to look for the point of needle *rather between the finger and thumb* than over *thumb nail,* otherwise a straight and running hem is the result. Great care and infinite patience are needed for direction 2; the tendency to take the thumb away too soon must be overcome, and the combination of progressive movement *forwards,* with strong hold for guiding the needle, watched and insisted upon, as also the rapid leap of thimble to regain the eye of the needle.

The stitch drill should now form the regular lesson, and should be prefaced every day by the earlier ones necessary. Every stitch should be inspected by the teacher, who can use a candidate or monitor to assist if the class is large; later on the children may be allowed to do two, four, or six stitches, and then leave *one on the needle.* While it is desirous that children are not bored with slow methods it is equally necessary that they are not permitted to do too much unchecked. Nothing is more easily acquired than slovenly work. Indeed, I doubt whether a child ill-taught in these early lessons ever becomes expert later on. The drill 7 is for *plain hemming*. Security and regularity are needed in this stitch; its use is principally to make neat the sides, edges, bottoms, &c., of all garments, and but for its occurrence in the Government Schedule first, I should certainly recommend its taking a third or fourth place in the teaching of needlework.

The slope of stitch leads to much argument amongst the uninitiated; but I feel sure only one opinion prevails amongst those who think the matter out. The right and wrong sides are exactly alike, the cotton forms a succession of the Roman figure V, and this is obtained only by attending to two points, viz., *point of insertion*, and *point of emergence* of the needle.

While it is absurd to teach a child to count the threads when hemming, it is equally absurd for a teacher to ignore threads altogether in calculation as to slope, distance, height and depth of the stitch. By giving distance of one stitch from another we regulate our work according to the relative coarseness or fineness of the material. For the guidance of the teacher let me therefore say that distance from stitch to stitch both above and below the hem fold should be about *four threads*, distance below the hem fold *one thread*, above it *two threads*. When such a piece is properly pressed and folded the *hem fold* will almost cover the one thread below, and thus produce the exact effect aimed at by only just a suspicion of the needle's insertion.

It will be better for a teacher to demonstrate this stitch many times upon the blackboard or, better still, let the children themselves do so upon their Kinder Garten perforating cards. Quite one half of the work of the rest of Schedule III. is done by hemming: this is my only apology for dwelling so long upon it. A child should be taught to look back at the *place where the needle was put in before*: if it is told to look at the last stitch it is too bewildering, seeing that there are three parts to remember. One excellent Infants' Mistress I know adopts an ingenious method which I give for those who may like stepping stones better than others. After doing the last stitch the children are taught to catch hold of the cotton near where it springs from the calico and place it down towards the left, following with their eyes the direction of the preceding stitch, getting it parallel with it, then by cleverly manipulating it with the left thumb hold it in its place until the needle point is put in. This plan certainly answers if we want the right direction and regular hemming at all costs, but not if any degree of rapidity is to be attained.

The child should keep the same piece from one lesson to another. A pencil mark may be made where the lesson of one day ends.

When the *striped* calico is used the needle must be inserted at each stripe and brought through above on a stripe these should be about twenty to an inch, which will give ten stitches. This will be found to be quite enough and a little attention to such details will more than repay a teacher, I have found it useful to mark a piece off in half-inches and tell a child to put as many stitches as fingers upon its hand. Anything that appeals to his observation without over taxing eyes and strength should be tried to get the hemming right.

Black cotton should be used at first, but not continued for more than a few weeks; it is not nice to use nor good for the eyes, *green* is preferable and might be substituted.

The hem should not be too narrow for young children or it will coil up under the little thumbs. One third inch is to be given when the black or green is used; afterwards this width can give place to one quarter inch.

As the first 8-inch strips cannot be utilized for garments of any kind they may be given to the Infants for slate rubbers; thus the very first work may be made useful.

In working Drill 7, be careful to make use of the third and fourth work fingers in guiding the cotton aright. It is my earnest hope that those who use these papers will quite avoid the rock upon which so many founder, namely, keeping the cotton in the hand and having it just under the last finger instead of above it and its companion, the cleanliness depends upon this, and the manual dexterity is much greater too.

The Hemming, Seaming and Stitching Drills will be found in next month's paper, also a sheet showing the calicoes to which I have referred.

(To be continued.)

Science Notes.

MOST interesting experiments have recently been made with a new coal-getting machine, which is the invention of Mr. T. C. Roberts-Horsefield. It is claimed for this invention that it directly tends to save life inasmuch as it saves the necessity of blasting. It is in fact a powerful hydraulic machine which by forcing a longitudinal plate into the coal brings it down in bulk. Holes are drilled as in the blasting process. The machine is then applied at the top. Two men work the pumps and in a short time a huge mass of over twenty tons is thrown down. There is no *slack* and very little dust. Under the present regulations the blasting can only be carried on at night when the men are out of the pit. If this machine should come into use coal could be worked both night and day. The public generally would rejoice at any new invention which would reduce the perils which miners bravely undergo. Accidents might still happen if blasting were discontinued, as that is only one, though perhaps the most dangerous, of the sources of disaster. Improvements have still to be effected in the safety lamp itself, and what is most important of all, the miners themselves have to learn yet more perfectly that indispensable as courage is, it is often of less value than prudence.

⁂

DR. PERCY FRANKLAND has recently communicated a paper to '*Nature*' containing an interesting account of the advances made in Bacteriology during the last twenty-five years. Pasteur's name will always be associated with the early investigation of these minute forms of life in connection with his researches respecting the so-called spontaneous generation. A great step forward in the cultivation of Bacteria was the substitution, by Koch, of a solid for a liquid nourishing medium. When living in fluids like broth it becomes difficult to register the rate of multiplication. If, however, a fluid containing organisms be introduced into gelatine-peptone which has been previously melted, they can be evenly distributed through the material, and when it solidifies they are isolated and confined to one spot. Ere long each organism becomes a centre of multiplication and though each of such colonies may consist of thousands of forms yet the spots themselves which indicate the colonies may be taken as representing the number of separate organisms in a definite amount of the original liquid taken. It thus becomes possible to get a pretty accurate notion of the number of these micro-organisms in, say, a teaspoonful of water. Dr. Frankland gives the number of organisms found in two gallons of air during the different months of the year. It will be seen how closely the number is connected with the warmest months of the year. January, 4; March, 26; May, 31; June, 54; July, 63; August, 105; September, 43; October, 35; November, 13; December, 20. The air fully out at sea is free from organisms, and wind, when it has reached the land, is free from germs provided it has come directly across a broad expanse of water. At ordinary elevations the number of germs is sensibly diminished and at great elevations they are entirely absent. They are much more frequent in busy dusty streets than in quiet squares and open parks. Indoors their number depends to a great extent upon the number of persons who are in the rooms. It appears that if water is not frothing or splashing it may contain almost any number of bacteria without communicating them to the air in the vicinity. Hence it was found that the air in sewers was remarkably free from micro-organisms.

All surface waters are found to contain a considerable number of microbes; water from deep wells, especially from the chalk, being on the other hand remarkably free from them.

The point of practical importance, how to keep clear of them, is not easily solved. That many of these forms are quite harmless is almost certain. It is equally probable that others are the source of much human suffering. The knowledge of these lowly forms which is now increasing so rapidly cannot fail to have many far reaching consequences in regard to public health. Some important results have been obtained already. The thorough boiling of milk and any doubtful water renders them safe in nine cases out of ten. Jams and tin meats can be preserved by carefully excluding the air, or reducing the temperature to a point at which these organisms are quiescent. Wounds heal more quickly and easily if kept from contact with the air. These are matters of prime concern; yet they are perhaps only the first fruits of what will follow.

⁂

THE Laboratory erected at Plymouth by the Marine Biological Association of the United Kingdom was opened on Saturday, June 30th, in the presence of a most distinguished company, including many of the most eminent scientific men in the kingdom. It is surprising and not creditable to us to learn that we have lagged behind other nations in the establishment of an institution of this kind. Fishing is a great British industry, a most important source of our food supply. Yet up to the present time there has been no scientific enquiry into the most efficient and economical way of securing the largest and best annual supply of fish. From the general impressions of those who are likely to know there can be no doubt that our present system of fishing is wasteful and haphazard. In these times of close competition when the struggle for existence is so keen, where is there a more promising field for enterprise than in supplying every town in the United Kingdom with plenty of cheap fresh fish. Any movement whether commercial or scientific which gives impulse to this undertaking is worthy of the approval and support of the English people.

⁂

ON Monday the 8th of July the air in the channel became so rarefied that objects could be seen with extraordinary distinctness at a distance of between thirty and forty miles from Dover and Folkestone. The *Times* says that the lighthouse at Cape Grésnez, Calais, and the dome of the Cathedral, and Napoleon's Column at Boulogne, could be distinctly seen with the naked eye, and every prominent object could be picked out along the French coast. The distance from Dover to Boulogne as the crow flies is 28 miles, and the column is about two miles further inland.

How to Teach School Children to Sing from Notes.

BY W. G. MCNAUGHT,

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DIVISION II.

Ear Exercises—continued.

62. Besides practising the imitation exercises described above, easy naming exercises should be given at every lesson. Tests in naming by ear are not required in the examination of this Division, but unless the practice is begun early, and the habit of observation established side by side with the singing from notes or names, the difficulties of the higher Divisions will be much increased.

63. The general experience of school teachers is that note naming by ear is a very difficult subject to teach. To a certain extent this difficulty is undoubtedly inherent, for the best teachers and the sharpest pupils find it easier to sing given passages at sight than to tell them (*i.e.*, name the notes) by ear. But allowing for this, it must also be said that the inability of a large number of school teachers to successfully teach 'telling by ear' is owing to two closely connected and to some extent removable causes, viz., 1st, the teacher's want of fluency in giving exercises; and 2nd in consequence of the natural diffidence arising from this deficiency an extremely unsystematic treatment of the subject.

64. The teacher's difficulty is that he cannot readily invent a great variety of exercises, and fluently sing them off to *laa*. He may *wish* and design to sing, say **s l f**, but in the act of laaing he finds himself singing something quite different. Conscious of this failing many teachers fall back upon the fatal plan of committing a few easy phrases to memory, and of giving them as tests to their pupils on every occasion. The obvious course for a teacher is to find every possible opportunity for the practice of vocalising (*i.e.*, singing to *laa*) at sight. Ear exercises can certainly never have a fair chance until the teacher can sing to *laa* with the greatest facility. It is altogether unfair to blame the pupils for a teacher's deficiencies in this respect.

65. It will be seen from the above how intimately the practice of laaing is associated with success in telling by ear. Inasmuch as a pupil in telling has to find the proper name of a tone disguised under the name *laa* the advantage of singing all tones to this syllable is easily understood. A good lesson should always include some practice in laaing at sight, or at least the laaing of passages that have been sol-faad once or twice. A systematic course of laaing will be described in dealing with the requirements of Division III.

66. It will be enough here to say that vocalising exercises should follow the course already laid down for teaching the scale. That is, the *doh* chord should be mastered first, and the other tones in the easiest position. As vocalising unknown music imposes a strain upon the attention, it should not be practised for more than a few minutes at a time, or when a class is physically and mentally fatigued.

67. The exercises should be practised in slow time, and the pupils besought to think of a tone before they strike it. If all the pupils of a large class vocalise a new exercise simultaneously there is danger that many will sing without thought, and acquire practically nothing. One of the most valuable principles of class management, viz., the utilisation of the competitive instinct, can be applied with effect in this case. Dividing the class into sections, one section can be pitted against another to vocalise what the other sol-faas. Further remarks upon vocalising will be made when Division III. is dealt with.

68. The practice thus indicated will be useful to the teacher as well as to the pupil. A course of easy and systematic ear telling should be founded upon these vocalising exercises. One of the easiest exercises is to get likenesses and unlikenesses clearly distinguished. Thus the teacher sings to *laa*

d m s

asking the class to notice the effect. Then he promises to sing again either the same thing or something different, the class to say what they think. The teacher should then sing four or five times over the same phrase, and finally he should alter it to say **d s m**. If the difference is felt, the next step will be to get the class to tell whether **d m s** or **d s m** is sung, then **s m d** or **s d m**, then **m s d** or **m d s**. Next the upper doh^1 should be added and all the variations beginning on doh, viz.

d m s d^1	**d s d^1 m**
d m d^1 s	**d d^1 m s**
d s m d	**d d^1 s m**

distinguished, the class being told the first tone. The variations beginning from *soh* and *me*, and *doh*^{1} should follow

s m d d^1 **m s d d^1** **d^1 m s d**
s m d^1 d **m s d^1 d** **d^1 m d s**
s d^1 m d **m d s d^1** **d^1 s m d**
s d^1 d m **m d d^1 s** **d^1 s d m**
s d d^1 m **m d^1 s d** **d^1 d m s**
s d m d^1 **m d^1 d s** **d^1 d s m**

and gradually as the skill of the pupils increases they should be made to discover the initial note. Similar exercises should now be given with the range **s** to **s**$_1$.

s$_1$ m d s **s$_1$ s d m**
s$_1$ s m d **s$_1$ d s m**
s$_1$ m s d **s$_1$ d m s** etc., etc.

If these exercises are persistently and carefully applied a foundation of ear telling power will be laid that will materially lighten the labours of higher standards.

69. The song requirement of this Division is as follows :—

'To sing in unison, in good time and tune and sweetly, a school song set to words. Five songs to be prepared.'

70. To sing a song in tune and sweetly implies a certain special attention to voice delivery. As a rule it is difficult in a school course to find time for voice exercises. It is, however, possible to get some very good results and certainly to avoid some very bad results by devoting a short time weekly to special voice exercises. The faults to be avoided are tendencies to shout, to sing feebly, flat, harshly, or with a nasal twang. The aim must be to get sweet, pure, full tune delivered without strain. The teacher must take care that he has control over his own voice and can give a pattern in a fairly pleasant tone and in good tune.

71. Improper or inadequate breathing is at the root of many faults of voice delivery. Children are apt to take too little breath, and they can seldom at first control the emission of breath. To meet this difficulty the class, standing in an upright but easy position, should be practised in holding the breath from four to six seconds, and then should try to hold a note of medium pitch (F or G) with a soft, clear quality of tone for about the same time. Then the doh chord should be sung to the syllables *koo*, *kaa*, and *laa* in the same soft tone, breathing at †

𝄐 † 𝄐
d m s d^1 **d^1 s m d**
koo koo koo koo
kaa kaa kaa kaa } The same
laa laa laa laa

For treble voices this exercise may be sung in Keys D and E, and later on in Key F. Altos should omit the **d**^{1}. When such an exercise can be sung as described it should be practised with slurs ; that is, thus :—

𝄐
d m s d^1 **d^1 s m d**
Koo — oo — oo — oo Koo — oo — oo — oo etc.

care being taken to avoid sliding.

72. Young children should not be expected to learn their songs from a book. A song is made of little phrases, the notes in each of which should be connected without break : these little phrases can be felt in reading at sight only by a fairly advanced class. With young children it is far better to teach songs by pattern. If this is done intelligently, songs are pleasantly and quickly learned and there is less chance of errors creeping in that are difficult to root out.

73. The plan of teaching songs by pattern is to first sing the song right through, to words if possible, in order to interest the class, and then to pattern, bit by bit, on the modulator. Take the following song as an example :—

'Where's the old grey goose.?'

1——— 2——— 3——— 4———
| d .r :m .f | s .s :s .s | l .f :d^1 .l | s :— }
5——— 6——— 7——— 8———
| l .f :d^1 .l | s :— | s .f :f .f | f .m :m .m }
9——— 10——— 11——— 12———
| m .r :r .m | d .m :s | s .f :f .f | f .m :m .m }
13———
| m .r :r .m | d :— ‖ From * 'Songs and tunes.' 1st Course.

The figures divide the song into thirteen fragments. Each fragment should be patterned while the teacher points on the modulator, and then imitated by the pupils, the teacher again pointing. When the fragments can be singly performed with ease, the song can be patterned in say six or seven phrases, and finally it should be sung complete from the modulator.

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* Price 3d. J. Curwen and Sons, Warwick Lane.

74. If the song is to be sung from books and the class is made up of children not quick in ordinary reading it will be well to pattern the song again, bit by bit, the children imitating from the book. In doing this the teacher should draw attention to the time values of the notes and show how the song combines the time and tune that have been taught.

(To be continued.)

How my School was Examined.

BY A

HEAD TEACHER.

INFANTS' DEPARTMENT.

SIX YEAR OLD CHILDREN.

As a *Reading* exercise these children were required to read a few sentences, or short passage from 'The Little Reader' No. II.

Writing and Dictation.—The children had to write their names, then to copy the word '*House*' from a blackboard, and to write from dictation the words:—*Pen, Book, Bee, Ink, Paper,* and *Day.*

In *Arithmetic* the following tests were given:—2 + 5 + 4 + 1 = 12; 6 + 12 + 14 = 32; 12 − 3 = 9; 19 − 11 = 8. These were done on slates. The Inspector also asked such questions in Mental Arithmetic as 2 + 8 + 1; 3 + 6 + 4; 8 − 2. How many farthings in a half-penny? In a penny? In twopence? I had 20 oranges and gave away 12; how many were left? 7 and 4 and 3; 8 and 5 and 1 and 4.

For *Sewing* and *Knitting*, the children were divided into two groups. In each group boys and girls were mixed. The first group had to do a piece of plain hemming in blue. The second group had knitting.

FIVE YEAR OLD CHILDREN.

The *Reading* was examined from Moffatt's 'Infant Readers.'

Spelling consisted of such words as *Cow, Boy, Girl, Leg, Man,* and *Ball.*

As a *Writing* exercise the children had to copy the word '*House*' from the blackboard.

In *Arithmetic*, the Teacher questioned the class on the ball-frame.

Sewing.—The children were set to do 'picking.'

BABIES' CLASS.

This class *wrote* on slates from memory the letters *a, h, m, o, b,* and a few figures; *read* the letters, capital and small, from Alphabet Card, and a Reading Sheet; and then the children were set to thread needles.

Object Lessons.—The Inspector questioned the children on the *Elephant*, on *Colour*, on *Time*, and on the *Bell.* The Master of the School asked questions on *Glass*, on a *Pin*, and on *Milk.*

The *Singing* was taught from note, and the Inspector tested from the Modulator, and sang some short passages for the children to imitate. The *Songs* sung were 'The Doll's Party,' and 'Now we Little Children assembled in School.'

The children recited two little pieces—'Welcome Little Robin,' and 'The Two Little Kittens.'

UPPER DEPARTMENT.

STANDARD I.

Arithmetic.—(1) 754 + 16 + 830 + 13 + 9; (2) 909 − 236; (3) 101 − 23.

Answers:—(1) 1,622; (2) 673; (3) 78.

Writing and Dictation:—A few lines of transcription from the Reading Book; and the following words from dictation:—*Money, Spend, Milk, White, Friend, Paper.*

Geography—The questions were mostly on the Plan of the School, and the Points of the Compass.

STANDARD II.

Arithmetic:—Two sets of sums were given:—

A. (1) Add 7,936; 847; 58; 699; and 83,899.
(2) 175,002 − 9,148.
(3) 76,807 × 754.
(4) 801,004 ÷ 7.

B. (1) 95,387 × 1,068.
(2) Add 79,368; 874; 8,376; 789; and 19.
(3) Take 75,479 from half a Million.
(4) 769,003 ÷ 11.

Answers.—*A.* (1) 93,439. (2) 165,854. (3) 57,912,478. (4) 114,429 + 1.
B. (1) 101,873,316. (2) 89,426. (3) 424,521. (4) 69,909 + 4.

Dictation.—The exercise consisted of six lines from one of the reading books.

Geography.—The Inspector questioned mostly on Mountain, River, Plateau, and Table-land; and the Master asked questions on the shape of the Earth, the Axis, Poles, Rotation and Revolution.

STANDARD III.

Arithmetic.—The following are two of the sets of sums given:—

A. (1) Add together £79,365 11s. 8½d., £73 14s. 9d., £18 18s. 6½d., £799 18s. 4½d., £135 9s. 10½d., £73,469 18s. 7¾d.

(2) Take £296 19s. 11¾d. from five hundred pounds.

(3) Divide 806,297 by 384.

(4) A man having £205, bought a horse for £37 10s. 6d., and, after paying for a carriage, found he had 17s. 6d. left. Find the cost of the carriage.

B. (1) Add £349 14s. 7¼d., £634 17s. 3d., £76 13s. 7¾d., £908 11s. 10d., £3 9s. 9½d.
(2) Divide 7,609,351 by 771.
(3) From £50,041 1s. 1¼d. take £9,892 19s. 4d.
(4) If 3,775 letters pass through a Post Office in a day, how many letters pass through it in a year?

Answers.—*A.* (1) £153,863 11s. 10¾d. (2) £303 0s. 0¼d. (3) 2,099 + 281. (4) £166 12s.
B. (1) £1973 7s. 1½d. (2) 9869 + 352. (3) £40,148 1s. 9¼d. (4) 1,377,875.

Geography.—The Inspector questioned especially on the occupations of the people in various parts of the Country, as, for example:—What do the people do in Cornwall? In the North of England? In Wales? In the Channel Islands? and so on.

STANDARD IV.

Arithmetic.—The following is a specimen test:—

(1) Multiply £7,285 7s. 4¼d. by 217.
(2) Divide £87,571 5s. 4¾d. by 91.
(3) Reduce 276,829 inches to miles.
(4) I earn 50s. a week; how much more must I earn per week to have £197 12s. per year?

Answers.—(1) £1,580,924 15s. 10¼d. (2) £962 6s. 5d. + 71f. (3) 4 mls. 2 fur. 38 pls. 0 yds. 2 ft. 1 in. (4) £1 6s.

Grammar.—What is a Personal Pronoun? A Relative Pronoun? An Interrogative Pronoun? What is the possessive of *me*? Of *thee*? Of *he*? What is the objective of *she*? Of *I*? Of *thou*? etc.

Parse.—'The skipper he stood beside the helm,
His pipe was in his mouth.'

Geography.—In this Standard also the questions were mostly on the occupations of the people in different parts of the British Empire, as:—What do the people do in the North of Ireland? In Victoria? In Canada? In New Zealand? In New South Wales? and so on.

Music:—The following tests were given in Division II.
Modulator.—**d' d s m d' m f m s d' t d' s l s d.**
Time Test.—| l :l | l :— | l :l | l :l | l :— | l :— ||
Ear Tests.—**s l s d; d' s l s; d' d l s.**

In Divisions III. and IV.
Modulator.—**m f s fe s m s l t d' ta l s l t d' m' d'.**
Time Tests.—(1) | l :l.l | l :— | l, : ||
(2) | l :— :— | l :l : | l :— :— | l :— :l ||
Ear Tests.—**d m s fe s; s m d' t; s s l s l t d'.**

Songs.—'How Beautiful upon the Mountains.'
'Down where the Bluebells grow.'
'The Mighty Norseman.'

In order to make this paper more complete and useful we add some questions for the upper Standards given in another school.

STANDARD V.

Arithmetic.—A Card.—(1) 7,730 at £1 7s. 9d. each.
(2) Add $\frac{3}{4}$ and $\frac{1}{8}$, and take $\frac{3}{10}$ from the sum.
(3) The rent of 230 acres 3 rds. 35 pls. is £307 19s. 2d. Find the rent of 92 acres 1 rd. 22 pls.
(4) Bought 5¾ tons of hay for £20 2s. 6d., and sold it at 4s. per cwt. Find the gain.

Answers.—(1) £10,725 7s. 6d. (2) $\frac{23}{40}$. (3) £123 3s. 8d. (4) £2 17s. 6d.

Composition.—The Inspector read a short story about a mischievous parrot which the children had to reproduce.

STANDARD VI.

Arithmetic.—A Card:—(1) What must be added to $3\frac{5}{9}$ to make $5\frac{14}{15}$?
(2) How many half-pence are left after taking ·0125 of a sovereign from ·25 of a half-crown?
(3) Find simple interest on £150 for 219 days at 4 per cent.
(4) What is the value of x in the proportion $2\frac{1}{3} : 3\frac{1}{4} :: x : 5\frac{1}{6}$.

Answers.—(1) $2\frac{17}{45}$. (2) 9. (3) £3 12s. 0d. (4) $3\frac{83}{117}$.

Composition.—Write an account of a Month's Holiday in the Mediterranean Sea; or of a pleasant Excursion to the Sea-side; or an essay on London Costermongers.

Grammar.—Searching questions were asked on the theory of analysis; and the following sentence from the passage for repetition was parsed and analysed orally:—

'I that denied thee gold will give my heart.'

Geography for upper Standards was examined by means of a blank map of Europe.

STANDARD VII.

Arithmetic.—A Card:—
(1) The keep of 35 horses costs £10 9s. 6d. per week. Find the cost of 56 horses from May 1st to June 11th, both inclusive.
(2) I mix 3 lbs. of tea at 2s. 4d. a lb., 9 lbs. @ 2s. 6d., 6 lbs. @ 4s. 9½d., 3¾ lbs. @ 5s. What is the price of the mixture per lb.?
(3) If Insurance is $\frac{3}{8}$ per cent., find the amount on £3,020.
(4) In an army 8 per cent. die, and 14 per cent. are killed, and there are left 1,638 men. How many were there at first?

Answers.—(1) £100 11s. $2\frac{2}{5}$d. (2) 3s. $5\frac{3}{29}$d. (3) £11 4s. (4) 2,100 men.

Drill was inspected, and the following course was pursued:—First the boys were sized, then formed into company, and then such commands were given as 'Form fours deep,' 'Fours right,' 'Fours left,' 'Form cavalry square, on the left,' 'Reform two deep,' 'Dismiss.'

——o——

Oral Teaching: The Preparation of Lessons and of Notes of Lessons.

BY JOSEPH H. COWHAM, F.G.S.,
Master of Method: Westminster Training College.

CHAPTER III.

The Preparation of a Lesson.

Illustrations, what they are and how to use them.—Oral teaching possesses the great advantage over self instruction by reading and by task work, that at every point of the lesson where difficulty presents itself the teacher is present to place the matter in a new light or to supply additional material; in fact it is in the skill the teacher manifests in recognizing and in clearing up these difficulties that the value of oral teaching mainly rests.

In the effort to assist the scholar to acquire new knowledge the teacher resorts very largely to illustrations. These may be—

1. **Verbal,** in which the teacher refers to something which is already in the minds of the children, and which is readily recalled in answer to his statements.

2. **Pictorial,** by which either a complete representation of the object under discussion is exhibited, or a diagram is drawn showing distinctly the portions of the figure in which most difficulty presents itself.

3. **Objects, Models, Apparatus,** which are capable of being brought under the immediate observation of the class.

Before taking the three forms of illustration named above in detail, it may be well to note that whatever form of illustration is adopted it should be familiar; that an illustration which itself requires explanation is faulty.

A student was recently teaching a first lesson to Standard III. on the County of Middlesex. He began by referring to the size of London. He sought to impress this by a description of the small country town from which he had recently come, and by contrasting it with the size of London. Now whilst this was an illustration admirably suited to the thought of the student and most helpful to him in his efforts to realize the immense size of London, it did not assist the London boy in the least. The student was advised to take some area well known to all the scholars in the class; to show this area on a sketch map and make a comparison between it and the wider area covered by London; and thus to encourage the children to estimate by careful measurement the size of London, and the time required to walk across or to travel round it. In this way the children, instead of starting with an illustration which is unfamiliar and which leaves them in a hazy and doubtful condition of knowledge, begin with what is known, and by a process of comparison and contrast arrive at some sound and serviceable knowledge of the town in which they live.

Verbal Illustrations.—That which we understand by the term verbal illustration may be best seen in the following contrast between the method of **telling** and that of **training**.

Example 1. Suppose the word 'carnivorous' occurs in a reading lesson: I may explain it by simply stating to the class that 'all animals which prey upon other animals are termed carnivorous,' or more briefly still that the word means 'flesh-eating.' This is the *telling* method. I may, however, proceed by illustrating the use of the term by contrasting the food of the horse and that of the lion; that of the tiger and the cow, and that of the wolf and the rabbit; then I may lead the children to group the animals named into two classes, viz., those which eat flesh and those which do not; then apply the term 'carnivorous' to the class containing the flesh-eating animals, and finally ask the class to define the term. This latter is the *training* method.

Example 2. In a **Grammar Lesson** I may tell the class that 'a pronoun is a word used instead of a noun, to prevent the too frequent recurrence of the noun in discourse.' I may, however, lead the children to the same truth by the following process:—

(a) Examples supplied by the Teacher:

1. John wrote beautifully and John gained a prize.
2. Jane ran to school, but Jane was late.
3. The bee flies from flower to flower and the bee gathers honey.

(b) Corrections made by the Class:

1. John wrote beautifully and **he** gained a prize.
2. Jane ran to school but **she** was late.
3. The bee flies from flower to flower and **it** gathers honey.

(c) Children to make similar examples to Group (a) and correct them as in Group (b).

(d) Collect the results of the teaching above:

1. That there is an awkward repetition of the noun in the first group of sentences. (*Children led by teacher to state this.*)
2. That this is avoided in the second group by using another word in place of the second noun. (*By children and teacher.*)
3. The word used in place of the noun is called a pronoun. (*Told by the teacher.*)
4. Definition of pronoun. (*Told by the children.*)

Example 3. In a **History Lesson** I may wish to teach that 'William the Conqueror was a powerful monarch.' The simple statement will convey a vague notion of the truth, and this may or may not remain—a mere skeleton of knowledge—in the child's mind. If, however, I relate the story of Senlac, the power and bravery of William as a soldier become evident; his development of the feudal system illustrates his power of statesmanship; his treatment of his brother Odo and his son Robert is evidence of the strength of his will. Thus, by a careful examination of three striking features of William's reign, the children may be led to a much more complete and full notion of the term 'powerful' as applied to William the Conqueror.

In each of the above cases the *telling* method proceeds by the short way of definition and direct statement, whilst the *training* method in each case is based upon a collection of examples and illustrations. Children are required to take the examples and illustrations supplied, and by way of comparison and contrast to discover truth for themselves, and through the effort to get that training in processes of thought which in after life will be vastly more valuable than whole stores of fragmentary facts and statements.

Pictorial Illustrations—Pictures and Diagrams.

A good supply of pictures is valuable not only for the brightness they impart to the schoolroom, and the interest they awaken in the minds of the children, but also because they form the quickest mode of conveying correct and reliable information about distant objects and places. The pictorial illustrations which are most effective for the purposes of oral teaching are not those which usually decorate our school walls. Maps, illustrations of various forms of natural history, scenes from nature, historical events, mechanical powers, industries, trades, &c.—these have their place, and often yield valuable information when other means of teaching are not available, as, for instance, during periods of relaxation from school lessons. The pictorial illustrations, however, most effective for teaching purposes are those which the teacher draws during the progress of his lesson. These sketches are valuable for the following among other reasons:—

1. The object can be drawn to any scale.
2. Any portion of the drawing of special interest and importance can be still further enlarged, and thus more clearly impressed, *e.g.*, the structure of the eye or the foot of an animal, a selected district in geography, an operation in science.
3. Unimportant details may be omitted, and thus the attention of the scholars will be concentrated upon the most essential features.
4. The drawing may be developed as the lesson proceeds.
5. By means of coloured chalks confusion between different portions of the drawing may be avoided.
6. Thorough preparation on the part of the teacher is ensured.
7. When copied by the class it forms a concise record available for entry in their note books, and at the same time is a training for children to embody their notions in graphic form.

Should the teacher find it necessary to prepare completed sketches before beginning his lesson, it is best to cover the portion of the drawing not required during the early stages of the lesson with paper held by drawing pins, and uncover each portion of his drawing as it is required. Children are close investigators of pictures, and when the entire drawing is shown at first, the teacher finds for a time the attention of his class difficult to direct; and the gradual unfolding of his drawing has the further advantage of maintaining the spirit of expectancy in his class throughout the lesson.

Object Illustrations.—Objects, Models, Home-made Appliances, &c. :—

It has already been stated (Chapter I.) that all, or some of these, may be brought with the greatest advantage into almost every lesson. With their introduction an awakened interest is at once manifest throughout the entire class. Unusual efforts are put forth by even its dullest members to see and handle the new object. When the class is questioned upon what is remembered it will be found that whilst very much that was verbally communicated is forgotten, the information gained by a personal inspection of objects remains, and is the first to be reproduced. Over and beyond the help to acquisition and retention which a display of objects and models affords, there are distinct educational advantages which no other form of teaching secures so fully and readily. There is the close and well-directed observation, by which first hand knowledge, both full and accurate, is obtained; the classification of the facts observed is conducted under the most favourable conditions, for whilst the effort is easy the results are sound and lasting; the inspection of the gradual production of the finished article through a series of manufacturing stages, and the observation of the sequence of effects obtained during the progressive stages of an experiment, these form an admirable preparation for the study of the more subtle and complex operations in nature and in science; and throughout the entire exercise there is induced a concentrated state of mind, which through repeated effort tends to become habitual, and which, when formed, will be of immense service in other branches of school study, and in every effort of life.

Objects should be collected as far as possible through the scholars and their friends. Local industries and the natural products of the surrounding district should be very fully represented. All these should be labelled and arranged in a school cabinet. Any objects mentioned in the text of the reading books, not already in the cabinet, should be obtained and be ready for exhibition when the lesson in which it is mentioned is taken. The natural products of the area selected for the geography lessons of the year form other objects of great service, and to these may be added the manufactures of the district, showing as far as possible the stages of the industry, from the raw material to the finished article. The specific subject, especially if a science be taken, will demand the collection of material and the making of apparatus.

Models, Home made Appliances, &c.—These are often found to be far more effective teaching material than the more elaborate and highly finished article which may be purchased. As a sample of many which have been made and found successful, the following may be mentioned :—

1. Models of countries, counties, river basins, &c., in sand and in plaster.
2. The phases of the moon, illustrated by eight painted balls, each mounted on the straightened wire of a bill file.
3. The eclipses of both sun and moon, illustrated by taking a piece of stiff cardboard to represent the plane of the ecliptic, with four discs of cardboard to represent the moon's orbit, and intersecting the first plane at an angle of 5°, and with the line of intersection (line of nodes) constant in direction.
4. A collar box with a circular disc poised on a peg and carrying beneath it a magnetised bar of steel. This will illustrate the construction and action of a mariner's compass.
5. A bar of soap is readily carved into the model of a bone, and, with the addition of powder obtained from coloured chalks, the structure of a section of bone is easily and almost perfectly imitated.
6. The action of water in springs may be illustrated by taking a small box having a glass side, and by arranging clay and gravel in alternate and inclined layers. The water when poured on the top of the layers will run along the gravel bed between the layers of clay, and may be collected as at a spring, if holes be made the end of the box into the gravel.
7. Boys have made for themselves kaleidoscopes, cameras, magic lanterns, the puzzle of looking through a brick, &c., thus applying the most important laws of reflection and refraction of light in the most instructive manner.

The above are examples of very many appliances which teachers and scholars may devise for the interesting and intelligent teaching of the class and specific subjects. Children especially are delighted when an object which they themselves have constructed is counted worthy of a place in the school museum.

PLAN OF A WRITING LESSON.

Standard I.

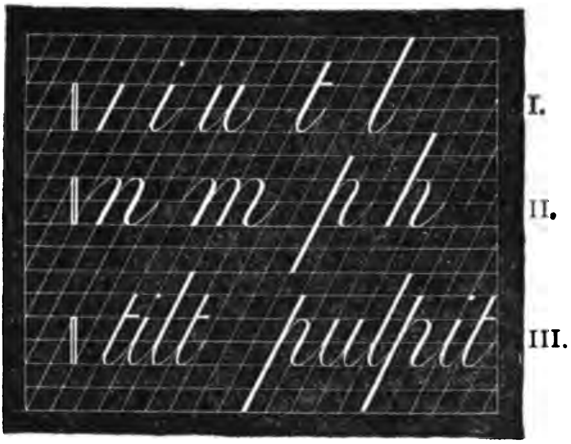
A. Preparation for Lesson.

1. Arrange the class, an equal number in each desk, and cause each pupil to cover from the front row.
2. Distribute writing material, pens and books, or sheets ruled with horizontal and oblique lines (Mulhauser's rhomboids), as shown on the sketch below.

   A writing monitor should be appointed whose duty it is to place at the end of each desk a supply of books and pens. These, at the word of command, are to be passed in an orderly manner to each scholar.
3. The teacher should decide the amount of matter necessary for one lesson, and should further determine the special points in writing he intends to teach.

   In this lesson the exact form of the right line /, the lower curve called the link J, and the upper curve called the hook ʔ, are to be taught.

B. Matter of the Lesson.



The above sketch presents simple matter, sufficient for one lesson; it is divided into three parts as follows :—

i. The first line consisting of letters made up of the right line and link.

ii. The second line containing letters introducing the hook in addition to the forms taught in the first line.

iii. Words made up of letters taken from lines i. and ii.

C. Oral Teaching.

Before the class begin to write attention should be drawn to the mode of writing the first line.

(*a*) Write the line on the black-board under the observation of the class.

(*b*) Show the scholars that the right line is perfectly straight and is the same thickness from top to bottom.

This may be further impressed by making an irregular stroke / and by asking the class to state wherein it is faulty.

(*c*) The lower curve (link) is exactly the same shape in every letter on the sketch. The common faults are:—(1) The curve is made too pointed or too flat / l. (2) The up stroke is made too straight, so that if continued it would cut through the following down stroke. Show these errors by examples, and allow the class to detect and correct them.

N.B.—The same method of oral teaching may be continued with lines i. and ii. after the preceding line or lines have been satisfactorily taught.

D. Class exercise in Writing.

Before allowing the class to write, arrange each scholar in the exact position you wish him to occupy, and start the writing exercise by means of the following signals:—

'**One.**'—Each pupil at this signal should place his book or paper exactly in front of him, with the top and bottom edges of his paper parallel to the edge of the desk.

'**Two**'—The scholars turn the left side to the desk and place the left arm upon it; the left hand to rest upon, and steady the paper.

'**Three.**'—Take up the pen and hold it out slightly in front.

The teacher seated at a table may do each of these movements for the imitation of the class, and should be especially on the alert at this stage in order to detect any pen held awkwardly. The steadiness or otherwise of his class at this point will be a fair indication of the kind of writing he may expect from his class. Unless these operations are performed in perfect order the writing which follows will be sure to suffer.

'**Four.**'—The children now dip the pen and proceed to write the first line twice.

E. Supervision of the Class.

The teacher must stimulate every member of his class during the writing effort. A careless stroke will spoil the copy. The children should be made to understand that every fresh line attempted must be an improvement upon the last. In order to do this:—

1. Move quickly round the entire class, pausing chiefly where careless writing is known to be probable.

2. Any observations the teacher directs to individuals may be in sufficiently loud a tone of voice to be heard by the entire class.

3. Whilst no fault is passed over without correction (by pencil) it is well to commend efforts on the part of any scholars which are very successful.

It is not well to praise frequently individuals by name; their work, however, may be commended in order to stimulate the remainder of the class to improved effort.

F. Correction of Faults.

Whilst individual faults are best corrected during the supervision stage, there will be certain common errors sufficiently marked to allow of class correction. In order to do this effectively:—

1. Use a black-board ruled as indicated in the sketch above.

2. Write the common errors in an exaggerated form, and allow the pupils to recognise and state them.

3. Write the corrected letter on the board as a model for the class.

4. When two or three common errors (not more) have been thus corrected the class should be encouraged to write one more line—the last and best—before proceeding to the next line of writing matter.

G. Close of the Lesson.

After each of the three parts of the lesson has been dealt with in the manner described above, the lesson may be closed by affixing a mark as an estimate of the value of the work done by each scholar. This is advisable with junior classes, but with older children other and higher incentives to excellent work may be applied. After the general review of the writing of the class the materials must be passed to the end of each desk for orderly disposal by the monitor.

* * *

Query Column.

RULES.

1. **Each correspondent is restricted to *one question*.** We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

⁂ All communications for this column should be addressed—'*The Query Editor,*' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.*

Algebra.

1. QUADRATIC.—Solve :—

$$\left.\begin{array}{r}[(1+x)^2+y^2]^{\frac{1}{2}}+[(1-x)^2+y^2]^{\frac{1}{2}}=4\\ (4-x^2)^2=18-4y^2\end{array}\right\}.$$

$$(1)\ [(1+x)^2+y^2]^{\frac{1}{2}}+[(1-x)^2+y^2]^{\frac{1}{2}}=4$$

$$[(1+x)^2+y^2]^{\frac{1}{2}}=4-[(1-x)^2+y^2]^{\frac{1}{2}}$$

$$\begin{aligned}\text{Squaring]}\ (1+x)^2+y^2&=16-8\,[(1-x)^2+y^2]^{\frac{1}{2}}\\&\quad+(1-x)^2+y^2\\ 8\,[(1-x)^2+y^2]^{\frac{1}{2}}&=16+(1-x)^2-(1+x)^2\\&=16+1-2x+x^2-1-2x-x^2\\&=16-4x\\ 2\,[(1-x)^2+y^2]^{\frac{1}{2}}&=4-x\\ 4\,[(1-x)^2+y^2]&=16-8x+x^2\\ 4\,(1-2x+x^2)+4y^2&=16-8x+x^2\\ 4-8x+4x^2+4y^2&=16-8x+x^2\\ 4y^2&=12-3x^2.\end{aligned}$$

$$\begin{aligned}(2)\ (4-x^2)^2&=18-4y^2\\ 16-8x^2+x^4&=18-(12-3x^2)\\&=18-12+3x^2\\&=6+3x^2\\ x^4-11x^2&=-10\\ x^4-11x^2+(\tfrac{11}{2})^2&=-10+\tfrac{121}{4}\\&=\tfrac{81}{4}\\ x^2-\tfrac{11}{2}&=\pm\tfrac{9}{2}\\ x^2&=\pm\tfrac{9}{2}+\tfrac{11}{2}\\&=10,\text{ or }1\\ \therefore x&=\pm 1,\text{ or }\pm\sqrt{10}.\\ 4y^2&=12-3x^2\\&=12-3,\text{ or }12-30\\&=9,\text{ or }-18\\ 2y&=\pm 3,\text{ or }\pm 3\sqrt{-2}\\ \therefore y&=\pm\tfrac{3}{2},\text{ or }\pm 3\,(-\tfrac{1}{2})^{\frac{1}{2}}.\end{aligned}$$

Notes.—(1) You copied your query incorrectly both times, as you placed the 4 from the first equation as belonging to the second equation also, instead of having a comma between the two equations. This carelessness caused a great deal of unnecessary labour.

(2) If in future you send a query, please enclose it in an *envelope*, otherwise it will not receive attention.

2. A MATHEMATICIAN.—If p rays are drawn through one point in a plane, and q rays through another point, no two of the rays being parallel, and if all the points of intersection are joined two and two by straight lines, find the number of lines.

No. of points of intersection $= pq$;

$\therefore$ No. of straight lines $= \frac{1}{2}pq\,(pq-1)$.

3. ELEVE.—If the nth term of an A.P. is $\frac{3n-1}{6}$, and S $= \frac{n}{12}(3n+1)$, find the series.

$$\left.\begin{array}{l}(1)\ a+(n-1)\,d=\dfrac{3n-1}{6}\\ (2)\ \dfrac{n}{2}\left\{2a+(n-1)\,d\right\}=\dfrac{n}{12}(3n+1)\end{array}\right\}$$

From (2),

$$\begin{aligned}2a+(n-1)\,d&=\tfrac{1}{6}\,(3n+1)\\ a+(n-1)\,d&=\tfrac{1}{6}\,(3n-1)\quad(1)\\ \therefore a&=\tfrac{1}{6}\text{ of }2\\&=\tfrac{1}{3}.\end{aligned}$$

$$\begin{aligned}a+(n-1)\,d&=\frac{3n-1}{6}\\ (n-1)\,d&=\frac{3n-1}{6}-\tfrac{1}{3}\\&=\frac{3n-3}{6}\\&=\frac{n-1}{2}\\ \therefore d&=\tfrac{1}{2}.\end{aligned}$$

$\therefore$ Series $= \frac{1}{3}, \frac{5}{6}, \frac{4}{3}, \frac{11}{6}$, &c.

The series could have been found more easily thus :—

Let $n = 1$,

Then, first term $= \frac{3-1}{6} = \frac{1}{3}$;

Let $n = 2$,

Then, second term $= \frac{6-1}{6} = \frac{5}{6}$;

$\therefore$ Difference $= \frac{5}{6} - \frac{1}{3} = \frac{1}{2}$;

$\therefore$ Series $= \frac{1}{3}, \frac{5}{6}, \frac{4}{3}$, &c.

Arithmetic.

1. GYMS.—Part of a sum of £3,000 is invested to produce 3½ per cent., and the remainder 4½ per cent. If the interest on the whole for a year amount to £122 9s. 10⅔d., find the sum invested at each rate.

Interest on £3,000 at 4½ % = £135;

Difference between this interest and the interest received

= £135 − £122 9s. 10⅔d.

= £135 − £122 $\frac{89}{180}$

= £12 $\frac{91}{180}$;

Difference between the interest on £1 at 4½ and 3½ % respectively = £$\frac{1}{100}$;

$\therefore$ Sum invested at 3½ % = £(12 $\frac{91}{180}$ ÷ $\frac{1}{100}$)

= £$\frac{2501}{2}$

= £1,250 10s.

Sum invested at 4½ % = £3,000 − £1,250 10s.

= £1,749 10s.

2. A. M.—A farm is let for £96 and the value of a certain number of quarters of wheat. When wheat is 38s. a quarter, the whole rent is 15 per cent. lower than when it is 56s. a quarter. Find the number of quarters of wheat which are paid as part of the rent. (*Barnard Smith.*)

Difference of (56s. − 38s.) or 18s. in the price of wheat makes a difference of 15 per cent. on the whole rent., when wheat is 56s. a quarter;

$$\begin{aligned}\therefore \text{(No. of qrs.} \times 18)\text{s.} &= 15 \text{ per cent. of } [\pounds 96 + (\text{No. of qrs.} \times 56)\text{s.}]\\ &= \tfrac{3}{20} \text{ of } \pounds 96 + \tfrac{3}{20} \text{ of } (\text{No. of qrs.} \times 56)\text{s.}\\ &= 288\text{s.} + (\text{No. of qrs.} \times 56 \times \tfrac{3}{20})\text{s.}\\ &= 288\text{s.} + (\text{No. of qrs.} \times \tfrac{42}{5})\text{s.}\end{aligned}$$

$$(\text{No. of qrs.} \times 18)\text{s.} - (\text{No. of qrs.} \times \tfrac{42}{5})\text{s.} = 288\text{s.}$$

$$\text{No. of qrs.} \times (18 - \tfrac{42}{5}) = 288$$

$$\text{No. of qrs.} \times \tfrac{48}{5} = 288$$

$$\therefore \text{No. of qrs.} = 288 \times \tfrac{5}{48}.$$

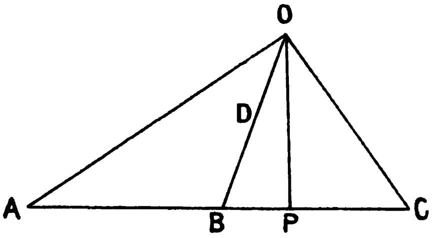
$$= \underline{30.} \quad \text{Ans.}$$

Trigonometry.

1. WILTSHIRE YOKEL.—A balloon was observed to be due S. and at an elevation of 30° at noon; and its shadow was one mile from the place of observation, the sun's altitude being 45°. At 11 a.m. and 1 p.m. the bearings of the balloon were S.E. by S. and S.W. by W. respectively. Find the velocity and the direction of motion of the balloon, supposing it to move uniformly at a constant height. And show that the nearest distance of the balloon from the place of observation was

$$\frac{\sqrt{3}+1}{4}\sqrt{10+3\sqrt{2}} \text{ miles.}$$

(*Todhunter's* 'Trigonometry for Beginners.')



Let O represent the position of the observer, and let A, B, C, represent the points on the ground which are vertically under the balloon at 11, 12, and 1 o'clock respectively.

Then ABC is a straight line, AB = BC, and OB is the direction due South from O.

The angle BOA = 33¾°, and the angle BOC = 56¼°.

Therefore the angle AOC is a right angle; and since B is the middle point of AC, it is the centre of a circle which could be described on AC as diameter, and which would pass through O.

Thus BO = BC = BA.

Let h denote the height of the balloon, and D the point on OB where the shadow of the balloon falls at noon.

Then since the altitude of the sun = 45°,

$$\text{BD} = h \cot 45^\circ = h;$$

$$\text{OB} = h \cot 30^\circ = h\sqrt{3};$$

But OD represents 1 mile;

$$\text{OB} = \text{OD} + \text{BD}$$

$$h\sqrt{3} = 1 + h$$

$$h(\sqrt{3}-1) = 1$$

$$\therefore h = \frac{1}{\sqrt{3}-1}$$

$$= \frac{\sqrt{3}+1}{(\sqrt{3}-1)(\sqrt{3}+1)} = \frac{\sqrt{3}+1}{3-1}$$

$$= \frac{\sqrt{3}+1}{2};$$

$$\begin{aligned}\text{BC} &= \text{BO}\\ &= 1 + h\\ &= 1 + \frac{\sqrt{3}+1}{2}\\ &= \frac{3+\sqrt{3}}{2}.\end{aligned}$$

$\therefore$ The balloon moves at the rate of $\frac{3+\sqrt{3}}{2}$ miles an hour.

The angle BCO = angle BOC = 56¼°;

$$\begin{aligned}\therefore \text{The angle OBC} &= 180^\circ - (56\tfrac{1}{4}^\circ \times 2)\\ &= 180^\circ - 112\tfrac{1}{2}^\circ\\ &= 67\tfrac{1}{2}^\circ;\end{aligned}$$

$\therefore$ Direction of the balloon is W.N.W.

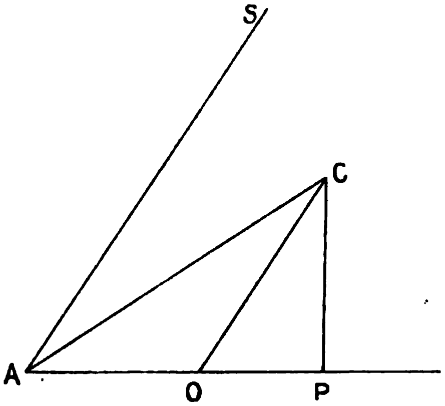
Draw OP perpendicular to AC; then the balloon is nearest to O, when it is vertically over P.

$$\begin{aligned}\therefore \text{Distance}^2 &= h^2 + \text{OP}^2\\ &= h^2 + \text{OB}^2 \sin^2 \text{OBC}\\ &= h^2 + \text{OB}^2 \sin^2 67\tfrac{1}{2}^\circ\\ &= h^2 + \text{OB}^2 \frac{\sqrt{2}+1}{2\sqrt{2}}\\ &= \left(\frac{\sqrt{3}+1}{2}\right)^2 + \left(\frac{3+\sqrt{3}}{2}\right)^2 \left(\frac{\sqrt{2}+1}{2\sqrt{2}}\right)\\ &= \left(\frac{\sqrt{3}+1}{2}\right)^2 + 3\left(\frac{\sqrt{3}+1}{2}\right)^2 \left(\frac{\sqrt{2}+1}{2\sqrt{2}}\right)\\ &= \left(\frac{\sqrt{3}+1}{2}\right)^2 \left\{1 + \frac{3\sqrt{2}+3}{2\sqrt{2}}\right\}\\ &= \left(\frac{\sqrt{3}+1}{2}\right)^2 \left\{1 + \frac{6+3\sqrt{2}}{4}\right\}\\ &= \left(\frac{\sqrt{3}+1}{4}\right)^2 (10+3\sqrt{2})\end{aligned}$$

$$\therefore \text{Distance} = \frac{\sqrt{3}+1}{4}\sqrt{10+3\sqrt{2}} \text{ miles.}$$

2. WILTSHIRE YOKEL.—The altitude of a cloud was observed to be α, and that of the sun in the same direction to be β, and the distance of the shadow of the cloud from the station of the observer was found to be c feet; show that the height of the cloud was $\frac{c \sin \alpha \sin \beta}{\sin(\beta - \alpha)}$ feet.

(*Todhunter's* 'Trigonometry for Beginners.')



Let A represent the station of the observer and C the cloud.

Draw AS towards the sun, and through C draw CO parallel to AS, meeting the ground at O.

Then O will be the position of the shadow of the cloud.

This depends on the fact that owing to the distance of the sun the straight lines drawn from the sun to the station and to the cloud may be considered parallel.

Draw CP perpendicular to the line representing the ground.

Then CP represents the height of the balloon.

$$\begin{aligned}\frac{\text{CO}}{\text{AO}} &= \frac{\sin \text{OAC}}{\sin \text{OCA}}\\ &= \frac{\sin \alpha}{\sin(\text{COP} - \text{OAC})}\\ &= \frac{\sin \alpha}{\sin(\beta - \alpha)}\end{aligned}$$

$$\therefore \text{CO} = \frac{\text{AO} \sin \alpha}{\sin (\beta - \alpha)}$$

$$= \frac{c \sin \alpha}{\sin (\beta - \alpha)}.$$

$$\frac{\text{CP}}{\text{CO}} = \sin \text{COP}$$

$$= \sin \beta$$

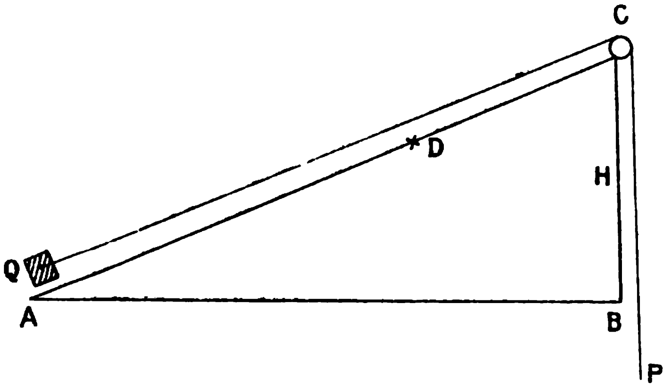
$$\therefore \text{CP} = \text{CO} \sin \beta$$

$$= \frac{c \sin \alpha \sin \beta}{\sin (\beta - \alpha)}.$$

$\therefore$ Height of cloud was $\dfrac{c \sin \alpha \sin \beta}{\sin (\beta - \alpha)}$ feet.

Mechanics.

————.—A descending weight P draws a weight Q up an inclined plane whose height and length are h and l respectively, by a cord passing over a pulley at the summit of the plane. Find where the cord must be cut that the weight Q may just reach the top of the plane.



AC $= l$, BC $= h$. If the point where the string is cut is at D, then let AD $= x$ and therefore DC $= l - x$. Q starts from A and acted on by the accelerating force acquires a velocity at D which just carries it on to C. The acceleration is plainly

$$g \frac{\left(\text{P} - \text{Q} \frac{h}{l}\right)}{\text{P} + \text{Q}} \text{ or } \frac{\text{P}l - \text{Q}h}{\text{P} + \text{Q}} \cdot \frac{g}{l};$$

$$\text{Hence } v^2 = 2 \frac{g}{l} \left(\frac{\text{P}l - \text{Q}h}{\text{P} + \text{Q}}\right) x \text{......i.}$$

The string is now cut and the velocity v is sufficient to carry Q to the top of the plane against the acceleration $g\frac{h}{l}$.

$$\text{Hence } v^2 = 2g\frac{h}{l} (l - x) \text{......ii.}$$

$$\text{From i. and ii. } 2g\frac{h}{l} (l - x) = 2\frac{gx}{l} \frac{(\text{P}l - \text{Q}h)}{(\text{P} + \text{Q})}$$

$$(l - x) = \frac{(\text{P}l - \text{Q}h)\, x}{(\text{P} + \text{Q})\, h}$$

$$l = x \frac{(\text{P}l - \text{Q}h + \text{P}h + \text{Q}h)}{(\text{P} + \text{Q})\, h}$$

$$l = x \frac{\text{P}\,(l + h)}{(\text{P}+\text{Q})\, h}$$

$$\therefore x = \frac{lh\,(\text{P} + \text{Q})}{\text{P}\,(l + h)} = \frac{\text{P}+\text{Q}}{\text{P}} \times \frac{hl}{h + l}$$

General.

1. **Magister.**—A vessel in the form of a cube, measuring 3 feet each way, is filled with water.

Find—(1) The pressure on its base in vacuo.

(2) The same in air. (*Blackie's* 'Mechanics.')

(1) Pressure in vacuo $= (3^3 \times 1000)$ oz.

$= \frac{27000}{16}$ lbs.

$= \frac{3375}{2}$ lbs.

$= \underline{1,687\frac{1}{2} \text{ lbs.}}$ Ans.

(2) Pressure in air $= (3^2 \times 144 \times 15)$ lbs. $+ 1,687\frac{1}{2}$ lbs.

$= (19,440 + 1,687\frac{1}{2})$ lbs.

$= \underline{21,127\frac{1}{2} \text{ lbs.}}$ Ans.

2. **A Student.**—The following are the eight cases of Proposition 2, Book I.:—

1. The given line has two extremities, to each of which a line may be drawn from the given point. This gives 2 cases.

2. The equilateral triangle may be described on either side of this line. This gives 4 cases.

3. The side BD of the equilateral triangle ABD may be produced either way. This gives 8 cases.

Note.—When the given point lies either in the line or in the line produced, the distinction, which arises from joining the two ends of the line with the given point, no longer exists, and there are only 4 cases of the problem.

You have given the 4 cases of (1) and (2), and have omitted the 4 cases under (3). The 5th and 6th cases you give fall under (1) and (2), and are therefore not included in the 8 cases. (See Note.)

3. **J. D. M.**—Please repeat your query, giving full particulars as to C_1, C_2, &c., as we have not the Algebra to refer to. The right hand expression is a Harmonical Progression.

4. **Spes.**—Three or four hours study is ample. You can do a good deal in that time, if you are not tired when you begin. You say you know a smattering of Latin. That may mean nearly all the accidence or almost nothing. A considerable acquaintance with Latin is required and you had better devote one hour a day to it, and if you are not master of the accidence you should learn that by repeating small portions of it many times over each day. It is one of the subjects that you can hardly teach yourself satisfactorily. If you get a competent teacher do as he wishes you. Meantime read Dr. Abbott's 'Via Latina.' You do not want a special list of all necessary books. You can find them mentioned over and over again in the Query Column of the back numbers of the Practical Teacher. For the French and German you should by all means take Hughes's new 'French and German Journal.' It contains just what you want.

5. **E. W.**—We have not yet met with anybody who will say he quite understands the new regulations. We are strongly of opinion that the answer to your question is NO. The examination was not intended for other than students. We will keep your enquiry before us and reply to you again if we find that you can present yourself as you suggest.

6. **Widmore.**—Any good book on English composition contains a chapter on the Essay and often hints on writing them. If you can express yourself clearly, easily, and grammatically, what you want is rather to practice writing than to read about it. It would be easy to name books. Read the papers on the Essay in the Practical Teacher. The main thing is practice and the study of the best models.

7. **A Pupil Teacher.**—Not in this column. Space is a consideration. You can, however, no doubt refer to back numbers and read the answers to examination questions. For the case you mention, write, say, four plain and neat sentences on each of the following heads.—It increases our own pleasure. It enables us to give pleasure to others. It greatly increases our power.

8. **Annulus.**—If you have the means of doing so consult Maxwell's paper on Saturn's Rings. Be more definite. Do you want an account suitable for Standard VII., or for the honours paper in a South Kensington Examination?

9. **Mab.**—We think not. But you would do well to write and ask the Secretary of the Tonic Sol-fa College the question. You might hear of the sort of thing you want.

10. **Ixion.**—Yes. (1) Twisden's 'Mechanics.' Lock's 'Dynamics for beginners.' Todhunter's 'Mechanics for beginners.' For the advanced algebra you would do well to add C. Smith's or Hall and Knight's larger books to Todhunter's 'Manual.' By comparing the chapters on the same subjects you will get considerable help. Smith's 'Conic Sections' (Macmillan and Co.) is also an admirable book. For the Calculus, use Williamson's books (Longmans and Co.). They are excellent. For the sound, light, and heat (Elementary) you might choose several books. Try Longmans and Co.'s new book by M. R. Wright.

11. **Querist.**—The English subjects for males at the 2nd year certificate examination, 1888, are:—Shakespeare's Julius Cæsar, Milton's Comus, Macaulay's Essays on Milton and Addison. There will be questions on paraphrasing and on the style, language, and subject matter. Heller's Code is published by Messrs. Bemrose and Sons, Old Bailey.

12. W. H.—Do you see the Query Column regularly? If so you will often see books recommended. Make a note of what you are likely to want. The first thing for you to get is the syllabus. You can get that by writing to the Registrar, Burlington House, Piccadilly. You must then decide what subjects you will take and at what date you will sit. Until that is done, we do not know what subjects you will have to study. The books you require depend partly upon what you know already and partly upon what you want to prepare for.

13. SCOT.—Grammar, Smith's (Murray), 3s. 6d.; Arithmetic, B. Smith's (Macmillan), 4s. 6d.; Mensuration, Todhunter's (Macmillan), 2s. 6d.; History, Green's (Longmans), 6s.; Latin, Abbott's 'Via Latina' (Seeley and Co.), 3s. 6d.; Algebra, Todhunter's (Macmillan), 2s 6d.; Geography, Mackay's (W. Blackwood & Son); French, Progressive Course (Macmillan), 1s. and 1s. 6d.; Music, Dunstan's Manual (Hughes), 3s.

14. R. O. R.—There is a small text book by Remsen, 2s. 6d., that would suit you very well. Work at it as well as read it. For a grammar you could consult Fasnacht's (Macmillan) or a score others. Be sure to read Hughes's 'French and German Journal.' It contains exactly what you want.

15. H. G. GOLDSMITH.—Yes, the syllabus is quite clear. Unless you have passed satisfactorily in that group before Christmas, 1888, you must take arithmetic. Now you have not thus qualified, therefore you must take the arithmetic.

——o——

Pupil Teachers' Preparation Papers.

THE following is a test paper for the pupil teachers who are to be examined in April. It covers about one-third of the work of the year. On receipt of a postal order for one shilling, any single set of papers will be examined, valued, and returned post free, if sent to us not later than August 20th.

TEST PAPERS FOR PUPIL TEACHERS WHO ARE TO BE EXAMINED IN APRIL.

Directions.

1. Write on half sheets of foolscap, and on one side only.
2. At the top of each half sheet write your name in full, the full address of your school, and the year the papers of which you are taking.
3. Do not write the questions, but prefix to each answer the number of the question to which it corresponds.
4. Do not use any book or writing from which answers may be copied.
5. Keep strictly to the time allowed.
6. If you have not time to answer all the questions, choose those you can answer best; but do not omit the whole of any one subject.
7. If you wish them examined, corrected, and valued, send them to the office of the 'PRACTICAL TEACHER,' Pilgrim Street, Ludgate Hill, together with a shilling postal order, not later than the 20th August. They will be returned post free.

END OF FIRST YEAR.

(Three and a half hours allowed.)

Arithmetic.

(Do three sums only.)

MALES.

1. What is the difference between a *fraction* and a *fragment*? How would you show the difference to a class? Write down the names of the different kinds of vulgar fractions, with examples. (35)

2. Find the L. C. M of all the numbers from 1 to 12, and the G. C. M. of 575 and 915. Write down a rule for finding the G. C. M. of three numbers. (35)

3. What fraction of 3 cwt. 16 lb. is $\frac{3}{11}$ of 2 qrs. 7 lb.? (30)

4. Simplfy $\dfrac{\frac{2}{3} \times \frac{5}{7} \div \frac{1}{18}}{\frac{4}{5} \times 6 \div 1\frac{7}{12}}$ (30)

FEMALES.

1. Practice is a short method for what rule? Work the following by both methods. 396 at 11s. 6½d. (35)

2. 3,523$\frac{11}{16}$ articles at £20 10s. 10¼d. each. (35)

3. 3 lb. 4 oz. 7 dwt. of silver at £4 2s. 6d. per lb. (30)

4. Make out the following bill: 7 lb. at 2s. 3d. per lb., 16 lb. at 7d. per lb., 11 oz. at 1s. 7d. per oz., 9 lb. at 3½d. per lb., 7 lb. at 7¾d., 3½ lb. at 1s. 10d. per lb. (30)

Geography.

MALES AND FEMALES.

(Answer three questions only.)

1. Draw a full map of England and Wales, or your own county, or Scotland. Insert parallels, if you can. (40)

2. Describe the physical features of Wales. (20)

3. What are the chief manufacturing and the chief mining counties of England? Give the towns in each. (20)

4. Where and what are the following?—Skiddaw, Bala, Bangor, Leeds, Avon, Middlesex, Ulverston, Stonehenge, Hastings, Deal. (20)

Grammar.

MALES AND FEMALES.

(Answer three question only.)

1. Analyse the following lines:—

Again I sit within the mansion,
In the old familiar seat;
And shade and sunshine chase each other
O'er the carpet at my feet. (20)

Bayard Taylor.

2. Parse the last two lines. (40)

3. Give definitions and examples of Abstract Nouns, Possessive Pronouns, Transitive Verbs, the Passive Voice, the Imperative Mood, Nouns in Apposition, the Nominative Absolute. (20)

4. Give the past tense and past participle of to *lie, stand, sit, fly, catch, bereave, cut, abide, thrive, smite.* (20)

Composition.

(Read the following story once only, and then write it from memory.)

Admiral Blake, when a captain, was sent with a small squadron to the West Indies on a secret expedition against the Spanish settlements. It happened in an engagement that one of the ships blew up. The crews were very much discouraged, but Blake, who was not to be subdued by one unsuccessful occurrence, called out to his men:—'Well, my lads, you have seen an English ship blown up; and now let's see what figure a Spanish one will make in the same situation.' This well-timed harangue raised their spirits immediately, and in less than an hour he set his antagonist on fire. 'There,' said he, 'I knew we should have our revenge soon!' (40)

History.

1. Name the kingdoms of the Heptarchy, and give the dates of their foundation. (25)

2. Write an account of Britain at the time of the Roman conquest. (25)

3. Name the Roman Emperors and generals who had anything to do with the conquest of Britain as fully as you can, and write a full account of one of them. (30)

4. What was the *Witan*? Who were called to it? What were *Romescot* and *Danegelt*? (25)

END OF SECOND YEAR.

FIRST PAPER.

(Three and a half hours allowed.)

Euclid.

MALES.

(Answer two questions, including question 3, if you can.)

1. To describe an equilateral triangle upon a given finite straight line. (20)

2. If two angles of a triangle are equal to one another the sides which subtend or are opposite to the equal angles, are also equal. (20)

3. A line which bisects the vertical angle of a triangle also bisects the base. Prove that the triangle is isosceles. (30)

Arithmetic.

FEMALES.

(*Answer the questions set for first year Males.*)

Grammar.

MALES AND FEMALES.

(*Answer questions* 1 *and* 2, *and one other question.*)

1. *How happy* is he *born* and taught
That serveth not *another's* will,
Whose armour is his honest *thought*,
And simple *truth* his utmost skill!

Whose passions not his masters *are*,
Whose soul is still prepared for death—
Not tied unto the worldly *care*
Of public fame *or* private *breath*.

Analyse the above passage. (20)

2. Parse the words in italics. (40)

3. Paraphrase the passage. (20)

4. What are *copulative verbs*, *defective verbs*, *reflexive pronouns*, *correlative conjunctions*, *gerunds*? Give examples. (20)

Geography.

(*Answer three questions only.*)

1. Draw an outline map of Europe, and insert the chief physical features; parallels and meridians required, if possible. (30)

2. Describe fully the Alps, or the Scandinavian range. (25)

3. Give a list of the rivers of Europe and describe minutely the course of the Rhine or the Rhone. (25)

4. What are the chief minerals of Europe; where are they found; and what are the chief mining centres of the different countries? (25)

SECOND PAPER.

(*Two hours and a half allowed.*)

Needlework for Females.

(*One hour allowed.*)

Arithmetic.

MALES.

(*Do three sums only.*)

1. If the carriage of 3 cwt. 3 qrs. 14 lbs. for 104½ miles cost £1 14s. 10d., what should be charged for the carriage of 5 tons a distance of 93 miles? (30)

2. A man spends 65 per cent. of his income, and has £434 remaining; what is his income? (30)

3. The population of a town was 5,600 in 1861, and 4,802 in 1871; what per cent. was the decrease? (30)

4. What is *ratio*? *proportion*? *interest*? What are the usual methods of working examples in proportion? State the merits of each. (40)

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. What were the respective claims of William the Conqueror and Harold to the throne of England? Give the chief events of the Conqueror's reign, with dates. (30)

2. Give an account of the struggle for the English crown after the death of Henry I. (25)

3. What were the chief features of the Norman rule in England? (25)

4. How could you show from the present condition of the laws and language, &c., of England that there had been a Norman conquest? (25)

Teaching.

(*Answer two questions only.*)

1. Correct the following piece of Dictation, putting in all needful stops, capitals, and other grammatical signs:—

A scythain prince named anacharsis came to athens to lern the wisdom of the greekes. he arived about the year b c 594 he betook himself to Solons house sent him word who he was and said i wish to live with you if i shall not cause you inconvenence solon replied seek for hospitality in your own country for he like the other greekes considered the Scythians barbarian's Anacharsis forthwith entered the philosophers apartment and said I am here in my own country justice demands that hospitality should unite us. (20)

2. Give six specimens of the various provincialisms which you have detected in your reading class, and say how you try to correct them. (20)

3. Write the word 'Multiplication' as a specimen of copy-setting on the blackboard. Say what directions you would give about the heights of various letters, and the method of forming and joining the letters. (20)

4. Write a dozen examples of questions in Second Standard Mental Arithmetic. (20)

END OF THIRD YEAR.

FIRST PAPER.

Three hours and a half allowed for this paper.

Euclid.

MALES.

(*Answer two questions, including question* 3, *if you can.*)

1. If a side of a triangle be produced the exterior angle is equal to the two interior and opposite angles, and the three interior angles of every triangle are together equal to two right angles. (30)

2. The straight lines which join the extremities of equal and parallel straight lines are themselves equal and parallel. (20)

3. ABCD is a parallelogram having the side AB greater than the side AC. The angle at C is bisected by the line CE, which meets the line DB produced to E. Show that three isosceles triangles are formed in the figure. (30)

Algebra.

MALES.

(*Answer two questions, including question* 1 *if you can.*)

1. Define the terms *product*, *quotient*, *co-efficient*, *indices*, *root*, and *factor*, and give examples of each.

If $a = 3$ and $b = 2$, find the value of

$$\frac{a^5 - b^5}{a^4 + a^3b + a^2b^2 + ab^3 + b^4}. \quad (30)$$

2. Show that the product of the sum and difference of two quantities is equal to the difference of their squares.

Add $(x + y)^2$, $(x - y)^2$, $(x + y)(x - y)$. (20)

3. Prove that $(x^2 + y^2 + z^2)(a^2 + b^2 + c^2) - (ax + by + cz)^2 = (bx - ay)^2 + (cy - bz)^2 + (az - cx)^2$. (20)

Mensuration.

MALES.

(*Answer one question only.*)

1. How do you find the area of a rectangle? Of a rhombus? Of any parallelogram? Find the area of a garden 30 ft. 6 in. long by 6½ yds. wide. (20)

2. How much paper, ⅝ yd. wide, would be required for the walls of a room 15 feet long, 13 feet broad, and 10½ feet high? (20)

Arithmetic.

FEMALES.

(*Answer three questions only.*)

1. Which is greatest and by how much:—$\cdot\dot{7}$ or ·76? What is the rule for converting recurring and non-recurring decimals to vulgar fractions? (40)

2. Add ·75 to ·075, substract ·075 from the sum, multiply the remainder by 7·5, and divide the product by ·0075. (30)

3. What is the value of ·325 of a cwt. in ozs.? (30)

4. I lost ·7 of my money, then I spent ⅓ of the remainder; with ⅓ of what was then left I bought a book, and then found I had 5s. in my pocket. How much had I to commence with? (30)

Grammar.

MALES AND FEMALES.

(*Answer questions* 1 *and* 2, *and one other question.*)

Thy chains the unmeasured universe *surround*;
Upheld by Thee, by Thee *inspired* with breath!
Thou the *beginning* with the end *hast bound*,
And bountifully mingled life *and* death!
As sparks mount upward from the fiery blaze
So suns *are born*, so worlds spring *forth* from Thee!
And *as* the spangles in the sunny rays,
Shine round the silver snow, the pageantry
Of *heaven's* bright army glitters in Thy praise.
Denshavin.

1. Paraphrase the above passage from an 'Ode to the Almighty.' (20)

2. Analyse the last five lines and parse the words in italics. (40)

3. Write ten Latin prefixes with their meanings with two examples of the use of each. (20)

4. Write a short lesson on Mood. (20)

Geography.

(*Answer three questions only.*)

1. Draw a map of Siberia *or* China, *or* Africa. (30)

2. Write full notes of the physical features of India. Illustrate by a rough sketch map. (25)

3. Name the rivers running into the Arctic Ocean from Asia and write a description of one of them. Give a sketch map. (25)

4. Which are the principal mineral districts of Asia? What articles do we export to Asia? (25)

SECOND PAPER.

(*Two hours and a half allowed.*)

Needlework for Females.

(*One hour.*)

Arithmetic.

MALES.

(*Answer three questions only.*)

1. Four reapers begin to cut a field of barley; after working for five days they have cut 10 acres; two additional men are then employed, who work at the same rate, and the whole is cut in three days more. How many acres does the field contain? (40)

2. Find the banker's discount on a bill for £731 0s. 6d., due 2½ years hence, at 5½ per cent. What will the banker gain? (30)

3. At what rate per cent. will the discount on £3,729 7s. 6d., due 4 years hence, be equal to the interest on £4,661 14s. 4½d. for the same time. (30)

4. A certain number of apples were bought at four a penny, and an equal number at three a penny. The whole were sold at seven for two pence; find the gain or loss per cent. (30)

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. Give a list of the battles of the Civil War, with dates, and a full account of one of them. (25)

2. Explain the title of James I. to the English throne. What were the chief events of his reign? Give dates. (30)

3. Who was Oliver Cromwell? Write a short account of the Protectorate. (25)

4. What attempts were made against the lives of the sovereigns of the Stuart period? Give dates. (25)

Teaching.

(*Answer two questions only.*)

1. Write full notes *for* a lesson on *Voice*, *Trade Winds*, or *Volcanoes*. If in infant school *Shades of Colour* for highest class. *A Tea Cup* for second class. State what apparatus, &c., you would use. (20)

2. How do you teach the different uses of words as parts of speech? Take the words *but* and *that* for the purpose of illustrating your answer. (20)

3. Write a dozen specimen questions you would use when revising a lesson on *Pronouns* (given to upper classes) or *Coal* (to infants). (20)

END OF FOURTH YEAR.

FIRST PAPER.

(*Three and a half hours allowed.*)

Euclid.

MALES.

(*Answer two questions, including Question 3, if you can.*)

1. Write out the definitions and the first proposition of the Second Book of Euclid. (30)

2. If a straight line be divided into two equal and also into two unequal parts, the rectangle contained by the two unequal parts, together with the square on the line between the points of section, is equal to the square on half the line. (20)

3. If a straight line be divided into two parts, prove that the squares on the two parts are least when the division is in the middle point of the line. (30)

Algebra.

(*Answer two questions.*)

1. What is an *equation*? an *identity*? Solve the equation

$$\tfrac{2}{3} \times \frac{x-1}{2x+1} = \tfrac{1}{2} \times \frac{x-3}{x+1} - \tfrac{1}{6}. \quad (20)$$

2. Reduce to their lowest terms

$$(1)\ \frac{x^2+x-12}{x^3-5x^2+7x-3}\,; \quad (2)\ \frac{x^4+a^2x^2+a^4}{x^4+ax^3-a^3x-a^4}. \quad (20)$$

3. If $a : b :: c : d$ show that

$$\frac{ma \pm nb}{ma} = \frac{mc \pm nd}{mc}. \quad (30)$$

Mensuration.

(*Answer one question.*)

1. Find the area of a circle whose circumference is 115¼ yards. (20)

2. A regular pentagon has a side of 6¼ inches, find its area. (20)

Arithmetic.

FEMALES.

(*Answer three questions only.*)

1. Find the simple interest on £6,870 for 73 days at 3½ per cent. (30)

2. What sum invested at 2½ per cent. will amount to £7,680 in 3 years, at simple interest? (30)

3. In what time will the simple interest on any sum of money at 3¾ per cent. be ·09375 of the principal? (40)

4. If 3 per cent. more be gained by selling a horse for £83 5s. than by selling it for £81, what was the original price? (30)

Grammar.

MALES AND FEMALES.

(*Answer questions* 1 *and* 2, *and two other questions.*)

1. *So when* thou hast, *as* I
Commanded thee, *done blabbing*—
Although to give the lie
Deserves no less than stabbing—
Yet stab at thee who will
No stab the soul can kill.—*Raleigh.*

Analyse the above passage. (20)

2. Parse the words in italics. (20)

3. What are the main elements of the English language. State what parts of it are Saxon. (20)

4. Write notes for a lesson on *Voice*. (20)

5. Explain, as to a class, the above verse, pointing out the languages from which the words are derived. (20)

Geography.

(*Answer three questions only.*)

1. Draw a map of the Mediterranean Sea, *or* Canada, *or* Australia. (30)

2. What are the causes of the seasons? (20)

3. How would you explain to a class the fact that the people in Australia see the sun in the north and we do not, and that they have summer when we have winter. (20)

4. Name the planets and state their respective distances from the sun. (20)

5. Write an account of the physical features of S. America, *or* N. America. (20)

SECOND PAPER.

(Two hours and a half allowed.)

(Needlework for Females. *One hour.*)

Arithmetic.

MALES.

(Answer three questions only.)

1. If 15 men, 12 women, and 9 boys can complete a piece of work in 50 days, what time would it take 9 men, 15 women, and 18 boys to do four times as much, the parts done by each in the same time 3, 2, and 1? (35)

2. A detachment of cavalry consisted of 520 men after engaging in two battles; in the first it lost one man in every 25, and in the second $\frac{5}{18}$ of the remainder. Of how many men did the troop originally consist. (35)

3. Find the square root of 549081 and of $5\frac{4}{9}$. (30)

4. A man sold £19,200 Three per Cent. Stock at 85, and invested the proceeds in Four per Cent. Stock at 96. What was his income before and after the transaction? (30)

History.

MALES AND FEMALES.

(Answer three questions only.)

1. What were the chief provisions of Magna Charta. (25)

2. What was the Domesday Book? Who ordered its compilation? Why? (Answer fully.) (25)

3. State how the country was governed during the Heptarchy, the Roman occupation, and after 1066. (30)

4. Give with dates a list of the Plantagenet and Norman Kings. (25)

Teaching.

(Answer two questions only.)

1. Write notes of a lesson on one of the following:—
(a) The Steam Engine. (b) A Storm. (c) Snow. (20)

2. Write a list of object lessons suitable for the Second and Third Standards. (20)

3. How do you teach spelling? (20)

FOR TEACHERS IN INFANT SCHOOLS.

1. Write notes of a lesson on 'A Bear,' *or* 'An Oak tree,' *or* 'A Visit to the Seaside.' (20)

2. Give a few examples in paper-folding, and say what benefit children derive from such lessons. (20)

3. Name the varied occupations you use in your school, and say what faculties of the child are developed by each. (20)

—o—

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,
Ex-President of the N.U.E.T.

VI.

IN previous papers of this series suggestions have been made of various means by which the students for whom they are written may acquire facility in the composition of short essays. In this paper a further suggestion is offered which, we have the best possible reason for knowing, may prove very serviceable if fairly put into practice. There are few persons preparing themselves for the work of teaching who have not frequent opportunities of hearing lectures and addresses on subjects which may interest them as teachers and be of practical use to them in their studies or in the discharge of their duties. Now the reporting of such lectures or addresses will afford excellent practice in composition.

To those who may have become expert in the useful art of writing shorthand, it will of course be possible to take down fully the very words of the lecturer. Then the exercise which would properly follow of transcribing the shorthand report into longhand would be in some measure an exercise in composition. This, however, is a rather laborious task, and is not, for our present purpose, so useful as another kind of reporting which we have chiefly in view, and which is available for such as may be quite ignorant of shorthand. We mean reporting from memory, which may be practised either with or without the aid of short notes taken during the lecture.

If the matter be reproduced entirely from memory its fullness will depend chiefly on the retentiveness of the memory, and that will depend largely on the closeness with which attention has been concentrated on the lecture. But as a result of experience it may be remarked that the conscious intention of reproducing what is heard conduces to closeness of attention, and further that the practice of such reproduction is a great help to strengthening the memory. Attention and memory are not, however, the only mental processes concerned in this practice of composition. It may well be that of themselves they are not the chief means by which students may gain the greatest advantage from hearing lectures.

It is not by mere mechanical absorption into the body that food becomes of real service to man, it is by the natural processes of chemical and physiological change that it becomes assimilated and converted into living energy of nerve and muscle. So it is with the mental food of useful information. It becomes of greatest use to us not by mere verbal appropriation by the memory, but by that complete assimilation which comes of letting the various mental forces work upon it in the processes of reflection and comparison. Hence we recommend the student who would get the most benefit from a lecture not to content himself with a bare report or summary of its contents, but to make free use of the information it conveys, to supplement that information by such other thoughts as it may suggest, and to so arrange the materials as to form a well-connected essay on the subject. Thus he may make the substance of the lecture thoroughly his own, and gain a decided step forward in the art of composition.

We propose to illustrate the foregoing remarks by a short essay, founded on the substance of an address recently delivered at a meeting of teachers on a subject of special interest and importance. The lecturer was Dr. Francis Warner, a medical man who has devoted his professional abilities to the cause of education, and the subject was one he has made his own.

THE OBSERVATION OF CHILDREN AT SCHOOL AS TO MENTAL FACULTY AND BRAIN CONDITION.

Educational systems can only be successful when they are properly adapted to the mental condition of those to whom they are applied. But the character of the mental faculties depends upon the condition of the brain, and the condition of the brain cannot be observed directly. It is a matter of inference, either from observation of the results of its action in learning lessons, or from other indications. Teachers, especially under the prevailing system of education, are liable to regard only those results which manifest themselves in examination, and for the great majority of healthy children such results may sufficiently indicate the character of brain and mind.

There are, however, in every school certain children, usually a small proportion, who differ considerably from the average in their mental power; and if we look only to the kind of work they do we may draw incorrect conclusions. It is of the highest importance to such children that the physical indications from which the condition of their brain and nervous system may be inferred should be carefully observed. Those children who have weak brains, who, in the working of the nervous system, differ greatly from the average, are more apt to get into trouble, are more liable to develop tendencies to evil.

Hence the subject is important not only to teachers, but to all who are responsible for the treatment of children, to parents, school-managers, school-inspectors, and those who legislate on education. Its special importance to teachers lies in the facts, first, that they are held so directly responsible for the results of instruction, and secondly, that they have peculiar opportunities for thorough and systematic observation of children.

Our knowledge on the general question of the condition of brain and nerve in children is not so full as it should be. This probably arises less from any want of readiness to observe, than from want of guidance as to what and how to observe. Now to be of real use, observations must be, not vague and general, but scientific and methodical; and further they must be definitely recorded. If teachers will devote some attention to this, a body of facts may be collected which may not only serve a useful purpose for the individual observers, but may also form a basis for larger generalisations for the public good.

Among the points to be observed the following may be mentioned; size, form, physiognomy. Notice whether a child is small or large for age, whether fat not only in face, but as to trunk and limbs. Notice also shape of head, and any deformity of body or limb.

Then look to the signs of active condition of brain. Physical signs will indicate whether it is fresh or tired, weak or over-excited. Remember that what is most important is the correct observation and the exact recording of facts; and do not be too ready to draw inferences. If, for example, a child is fidgetty and mischievous, notice carefully whether the restlessness continues if his position be changed, or if he be moved from his neighbours.

Young children are full of spontaneous movement. As we become older spontaneous movement becomes less and less, until almost all movement is a matter of effort. Fatigue is not shown by a child being motionless. Rather with fatigue spontaneous movements begin to increase. With regard to such movements the teacher should notice what parts of the body are most affected by them, and to what extent.

A teacher must not expect to be able to draw a correct conclusion at once from his observations, much less must he suppose that careful observation will lead directly to the discovery of proper modes of treatment or specific remedies for defects. He may, however, be sure that the more systematic his observations the more likely they are to lead to true inferences, and that correct diagnosis is a preliminary to proper scientific treatment.

Here are some physical signs of a state of nervous weakness in a child: restlessness in sleep, nightmare, grinding of teeth; too tall for weight, face too thin, or possibly arms too thin, head not held upright, shoulders not on same level, trunk slightly inclined to one side (best seen from back). The balance of the body is a very important matter to observe. It may be well noticed by asking the children to hold their hands straight out in front with palms downwards. While the healthy child will, as a rule, keep them horizontal in a line with the shoulder, with all the fingers in the same plane, the weak or nervous child will have the arms inclined, the wrists bent, the hands drooping, or the fingers awkwardly separated.

The face gives many indications of brain condition. A furrowed brow, knitting of the eyebrows, vertical furrows between the eyebrows, often indicate chronic headaches or nervous exhaustion. The middle part of the face shows early signs of weariness, as in the fulness of the lower eyelids. Want of movement in the mouth is also a mark of fatigue. The child who is fresh and healthy exhibits constant play of features. Restless eyes are thought to be indicative of inattention; but other features and parts of the body should be noticed, or the inference may be a wrong one.

These are a few only of the points which should be observed for the purpose set before us. If teachers generally would follow the suggestions given, valuable results would surely be attained. A word should be said before closing to warn the reader against supposing that when observations are made, and correct deductions drawn from them as to weakness of brain or nerves in certain children, that the only consequence should be to withdraw such children from instruction. This would be to increase and perpetuate the evil, and would probably occasion a moral deterioration most disastrous to the children so neglected, and also to society. The proper training of these children is therefore a momentous matter for the State. When careful observation has discovered which children deviate so far from the normal condition as to be unfit for the ordinary mode of training, then comes the serious question what plan must be adopted for their education, and with this problem the present essay does not attempt to deal.

(To be continued.)

Model Answers to Certificate Questions, Christmas, 1887.

Male Candidates.
SECOND YEAR.

Greek.

Male Candidates may answer questions in *two* Languages.
TWO *hours allowed for this Paper.*

SECTION I.

1. Translate into English :—

Ἐπειδὴ δὲ συνῆλθον, λέγει ὁ Κλέαρχος *τάδε·* Ἐγώ, ὦ Τισσαφέρνη, *οἶδα μὲν ἡμῖν ὅρκους γεγενημένους καὶ δεξιὰς δεδομένας, μὴ ἀδικήσειν ἀλλήλους· φυλαττόμενον δὲ σέ τε ὁρῶ ὡς πολεμίους ἡμᾶς, καὶ ἡμεῖς ὁρῶντες ταῦτα ἀντιφυλαττόμεθα.* Ἐπεὶ *δὲ σκοπῶν οὐδὲν δύναμαι οὔτε σὲ αἰσθέσθαι πειρώμενον ἡμᾶς κακῶς ποιεῖν, ἐγώ τε σαφῶς οἶδα ὅτι ἡμεῖς γε οὐδ' ἐπινοοῦμεν τοιοῦτον οὐδέν, ἔδοξέ μοι εἰς λόγους σοι ἐλθεῖν ὅπως, εἰ δυναίμεθα, ἐξέλοιμεν ἀλλήλων τὴν ἀπιστίαν.* Καὶ γὰρ *οἶδα ἤδη ἀνθρώπους τοὺς μὲν ἐκ διαβολῆς τοὺς δὲ καὶ ἐξ ὑποψίας, οἳ φοβηθέντες ἀλλήλους, φθάσαι βουλόμενοι πρὶν παθεῖν, ἐποίησαν ἀνήκεστα κακὰ τοὺς οὔτε μέλλοντας οὔτ' αὖ βουλομένους τοιοῦτον οὐδέν. Τὰς οὖν τοιαύτας ἀγνωμοσύνας νομίζων συννυσίαις μάλιστα ἂν παύεσθαι ἥκω καὶ διδάσκειν σε βούλομαι ὡς σὺ ἡμῖν οὐκ ὀρθῶς ἀπιστεῖς.*

2. Parse *αἴσθεσθαι, ἐξέλοιμεν, φθάσαι.*

3. *ἦ πολύ με δόξης ἐξέπαισαν ἐλπίδες,*
ἣν πατρὸς ὑμῶν ἐκ λόγων ποτ' ἤλπισα.
σοὶ μὲν γὰρ Ἄργος ἔνεμ' ὁ κατθανὼν πατήρ,
Εὐρυσθέως δ' ἔμελλες οἰκήσειν δόμους,
τῆς καλλικάρπου κράτος ἔχων Πελασγίας,
στολήν τε θηρὸς ἀμφέβαλλε σῷ κάρᾳ
λέοντος, ἧπερ αὐτὸς ἐξωπλίζετο·
σὺ δ' ἦσθα Θηβῶν τῶν φιλαρμάτων ἄναξ,
ἔγκληρα πεδία τἀμὰ γῆς κεκτημένος,
ὡς ἐξέπειθες τὸν κατασπείραντά σε·
ἐς δεξιὰν δὲ σὴν ἀλεξητήριον
ξύλον καθίει δαίδαλον, ψευδῆ δόσιν.
σοὶ δ' ἣν ἔπερσε τοῖς ἑκηβόλοις ποτὲ
τόξοισι δώσειν Οἰχαλίαν ὑπέσχετο.
τρεῖς δ' ὄντας ὑμᾶς τριπτύχοις τυραννίσι
πατὴρ ἐπύργου, μέγα φρονῶν εὐανδρίᾳ,
ἐγὼ δὲ νύμφας ἠκροθινιαζόμην,
κήδη συνάψουσ', ἔκ τ' Ἀθηναίων χθονὸς
Σπάρτης τε Θηβῶν θ' ὡς ἀνημμένοι κάλῳς
πρυμνησίοισι βίον ἔχοιτ' εὐδαίμονα.

4. Parse *ἦσθα, κεκτημένος, καθίει, ἀνημμένος, κάλῳς.*

(1) When they met, Clearchus said, 'I know, Tissaphernes, that we have exchanged oaths and given pledges that we will do no injury to each other; but I see that you are on your guard against us as against enemies, and we, seeing this, are, on our side, on our guard against you. But as on observation I cannot detect you in any attempt to harm us, and I am sure that for our part we have no such thought in our minds, I determined to seek an interview with you, that we might, if possible, remove our mutual distrust. For I have known cases before now, arising sometimes from false insinuation, sometimes from suspicion, in which men, standing in fear of each other, and wishing to strike the first blow instead of waiting to receive it, have done irremediable wrong to those who neither designed nor desired anything such as was suspected. Thinking then that misunderstandings of this kind may easiest be ended by free intercourse, I have come to you and desire to prove to you that your distrust of us is unfounded.'

(2)

αἴσθεσθαι.	2 aor., inf., depon. of *αἰσθάνομαι.*
ἐξέλοιμεν.	2 aor., opt., act., 1st plu. of *ἐξαιρέω.*
φθάσαι.	1 aor., inf., act. of *φθάνω.*

(3) Far have my hopes dashed me down from that expectation which once I dreamed should come to pass according to your father's words. On *you* your father was to bestow Argos when he died, and you were to dwell in the house of Eurystheus, holding sway over the fertile Pelasgian land; and on your head it was his will to set the lion's fell, the armour wherewith he was wont to arm himself. *You* were to be lord of Thebes, the city of chariots, possessing the plains, that were my marriage portion: such promise did you win from your sire; and in your hands he would fain place his weapon of fence, the club cunningly fashioned, a traitor gift.* To *you* he promised to give Oechalia, which he made boot of in the days of old with his far-ranging arrows. And so with threefold princedoms did your father exalt you his three sons in the pride of his manly strength. And my part was to choose for you your brides, seeking alliances from the Athenian land, from Sparta and Thebes, that, like ships well moored with stout cables, you might live a prosperous life.

(4)

ἦσθα.	2 sing., imperf., indic., *εἰμὶ* (be).
κεκτημένος.	Perf., part., depon., nom., sing., masc., *κταόμαι.*
καθίει.	3rd sing., imperf., indic., act., *καθίημι.*
ἀνημμένος.	Perf., part., pass., nom., sing., masc., *ἀνάπτω.*
κάλῳς.	Dat., pl. mas., *καλὼς* (Attic form for *κάλος*, a cable).

SECTION II.

Translate into Greek :—

(*a.*) If Cyrus had not come, the Greeks would not have marched against the king.

(*b.*) As to the Tigris, ye know that it is impossible to cross it.

(*c.*) There was a city on the other side of the river, Cænæ by name, whence they brought bread and cheese.

(*d.*) It is right to destroy utterly those who forswear themselves.

(*e.*) So long as I live thou shalt never kill the children of Herakles.

(*f.*) Standing afar off he repels his foes with arrows.

(*g.*) The son is called by the same name as the father.

(*a*) *εἰ μὴ ἦλθεν ὁ Κῦρος, βασιλεῖ οὐκ ἂν ἐπεστρατεύσαντο οἱ Ἕλληνες.*

(*b*) *τὸν δὲ Τίγρητα ποταμὸν ἴστε ὡς διαβῆναι ἀδύνατον.*

(*c*) *πέραν δὲ τοῦ ποταμοῦ πόλις ᾠκεῖτο ὄνομα Καιναὶ, ἐξ ἧς ἄρτους καὶ τυροὺς διῆγον.*

(*d*) *δίκαιον γὰρ ἀπόλλυσθαι τοὺς ἐπιορκοῦντας.*

(*e*) *εμοῦ ζῶντος οὐ κτενεῖς ποτε τοῦς Ἡρακλέιους παῖδας.*

(*f*) *ἑκὰς ἀφεστὼς πολεμίους ἀμύνεται τοξεύμασιν.*

(*g*) *ὁμώνυμος τῷ πατρὶ ὁ παῖς.*

SECTION III.

1. Give an abstract of the life and character of Clearchus, as sketched by Xenophon. Who were the Ephori whom he mentions? State what you know of Gorgias.

2. (*a.*) *Ἣν μὲν ἤλθομεν ὁδὸν ἀπιόντες παντελῶς ἂν ὑπὸ λιμοῦ ἀπολοίμεθα.* Comment on the case of *ὁδὸν*, and the use of the optative.
   (*b.*) *Ἴσως δε που ἢ ἀποσκάπτει τι ἢ ἀποτειχίζει ὡς ἄπορος εἴν ἡ ὁδός.* One editor reads *ᾖ* for *εἴη*; give reasons for supporting (1) the text; (2) the emendation.
   (*c.*) *Ἀλλ' οὐκ ἐμοῦ γε δεσπόσεις χαίρων ποτε.* Translate and comment.
   (*d.*) *οὐ γὰρ ἔσθ' ὅπου ἐσθλόν τι δράσας μάρτυρ' ἂν λάβοις πάτραν.* Translate and comment.

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* A gift promised but not completed.

3. Give the exact derivations of the following words:—dramatist, paralysis, apostle, practical, epigram, economy, poet.

4. Point out any peculiar uses of the imperfect tense occurring in the books set.

5. Distinguish between the uses of *ἐπί, παρά, πρός* and *περί*, with the genitive, dative, and accusative cases respectively.

1. *Clearchus*' chief characteristic was his restless energy and ambition, which found their best opportunity in war and made peace intolerable to him. At the end of the Peloponnesian war he persuaded the Spartan government to send him with a force to the Thracian Chersonese, to protect the Greek cities there from the Thracians. Being recalled, he refused obedience, and was sentenced to death in his absence. He then threw himself into the schemes of Cyrus, raised a force for him, and joined him on his march to Babylon. It was by his influence that the ten thousand Greeks were dissuaded from abandoning Cyrus when they discovered the real object of the prince. He commanded the right wing at Cunaxa, and was, after Cyrus's death, tacitly acknowledged by the Greeks as their commander. He fell into the trap laid for him by Tissaphernes, and with the other Greek generals was captured, sent to Artaxerxes, and beheaded. He was an able general; maintaining discipline by a severity which alienated the affection of his men, though his coolness and resourcefulness in moments of danger won their confidence and admiration.

The *Ephori* were five magistrates of Sparta, whose functions were originally judicial. They gradually, however, extended their authority, and at this time may be considered as the chiefs of the executive, the two kings being little more than commanders-in-chief of the army.

Gorgias, of Leontini in Sicily, a sophist, or professional lecturer on philosophy and literature. He was contemporary of Socrates, and has given his name to one of Plato's dialogues. Xenophon mentions that Proxenus was one of his pupils.

2. (*a*) *ὁδὸν*, an extension of the cognate accusative, carrying on the meaning of the verb *ἤλθομεν*.
   ἂν—ἀπολόιμεθα, the apodosis of an indistinct future condition, the protasis of which is contained in the participle, *ἀπιόντες*.

   (*b*) (1) the reading *ᾖ* is in agreement with the usual rule, that in final clauses ('in order that'), the primary conjunctive is used if the verb of the principal clause be primary.
   (2) The defence of the reading *εἴη*, which breaks the above rule, is 'that the speaker introduces the aim of another person, not as existing in his own mind, but in the mind of that person, so that the sentence partakes of the character of *oratio obliqua*.'

   (*c*.) 'But never shalt thou lord it over me at thy will.' An idiomatic use of *χάιρων*, 'rejoicing,' *i.e.*, without suffering for or repenting of your act.

   (*d*.) 'For thou wouldst find nowhere a country that would bear witness to any noble deed of thine.' Literally 'There is no place where thou wouldst get (thy) native land as a witness, having done any good deed.'
   λάβοις ἂν is the apodosis of a conditional sentence whose protasis is not expressed, being readily supplied from the sense of the context 'if thou shouldst make the attempt.'

3.

dramatist.	Formed from stem *dramat-* with suffix *-ist*. Greek *δρᾶμα* from verb *δράω*, to do.
paralysis.	Borrowed from the Greek, *παράλυσις*, a compound of *παρὰ*, preposition, and *λύσις* from stem *λυ-*, loose.
apostle.	From the Greek *ἀπόστολος*, one who is sent: compounded of *ἀπὸ*, preposition, and noun stem *στολ-* related to verb stem *στελ-* of *στέλλω*.
practical.	Formed with adjectival suffix *-al*, from stem *practic-*; Greek *πρακτικ-ὸς*, from verb stem *πρακ-* of *πρᾶσσω*.
epigram.	From Greek *ἐπίγραμμα* compounded from *ἐπὶ*, preposition and *γράμμα* from *γράφω*.
economy.	From Greek *οἰκονόμος* (the *e* representing a more correct *æ*); *οἶκος*, house, and *νέμω*, distribute, manage, direct.
poet.	From Greek *ποιητὴς*, a maker, formed by suffix *-της* from *ποιέω*.

(4) The imperfect tense is often used of an action contemplated, but never completed. Very good instances are the imperfects in the second passage for translation in Sect. I., *ἔνεμε, ἀμφέβαλλε, καθίει*, etc., which all express the intention of Herakles in the bestowal of his property on his sons, an intention which was not to be carried out.

5. *ἐπί* with genitive, 'rest upon.'
ἐπί with dative, 'rest at' or 'on.'
ἐπί with accusative 'to' or 'against' (motion implied).
παρά with genitive 'motion from beside.'
παρά with dative 'rest by the side of.'
παρά with accusative 'motion to or by the side of.'
πρός with genitive 'motion from near.'
πρός with dative 'rest at or near.'
πρός with accusative 'motion to near.'

Male and Female Candidates.

FIRST YEAR.

Latin.

Male Candidates may answer questions in *two* Languages; *Female* Candidates in *one* only.

TWO *hours allowed for this Paper for Male Candidates;* THREE *hours for Female Candidates.*

SECTION I.

1. Translate into English :—

(*a*) Sophocles ad summam senectutem tragœdias fecit: quod propter studium quum rem negligere familiarem *videretur*, a filiis in judicium vocatus est, ut, quemadmodum nostro more male rem gerentibus patribus bonis interdici solet, sic *illum* quasi desipientem a re familiari removerent judices. Tum senex dicitur eam fabulam, quam in manibus habebat et proxime scripserat, Œdipum Coloneum recitasse judicibus, quæsisseque, num illud carmen desipientis videretur?

(*b*) Cujus sermone ita tum cupide *fruebar*, quasi jam divinarem, id quod evenit, illo exstincto *fore* unde discerem neminem.

2. Parse fully the words printed in italics.

3. Say briefly what is the object of the dialogue *De Senectute*, and what is the general character of the argument.

4. Decline the present Indicative of *dixisset*, *potest*, *evenit*. What kind of verbs are *potest*, *inquit*, *fruebar*? What is the past Indicative of *divinarem*? Decline it.

(1) (*a*) Sophocles composed tragedies to extreme old age, but appearing to neglect in this occupation his private affairs, a suit was brought against him by his sons, to the end that, just as amongst us fathers who manage their affairs ill are interdicted from the control of their property, he too as being fallen into his dotage, might be removed by the court from the management of his private estate. Upon this the old man is said to have read aloud to the court the Oedipus Coloneus, which he held in his hands and had recently written, and to have asked whether they thought that poem the work of a dotard.

(*b*) In his conversation I at that time took an eager delight, just as though I had a presentiment of what proved to be the fact, that after his death I should have no one from whom I could learn.

(2) *videretur*—3rd pers., sing., imperf., subj. of *videor* (deponent).
illum—acc., sing., masc. of *ille* (demonstrative used as 3rd personal pronoun) object of *removerent*.
fruebar—1st pers., sing., imperf., ind. of *fruor* (deponent).
fore—fut. inf. of *sum*; in substantival clause, depending on *divinarem*.

(3) The purpose of 'The Treatise de Senectute' is to disprove the justice of the common complaints against old age, that it cripples a man's activity, numbs his capacity for enjoyment, and forces him to live with the fear of death constantly present to his mind. The treatise is intended rather to please by its literary grace than to convince by its logic. The answers to the accusations made against old age, are, that granting the vigour of the body decays, that of the mind increases; that the pleasures the old lose their power of enjoying are chiefly the lower and animal pleasures; but to intellectual pleasure they are at least as susceptible as ever. As to the fear of death, there is no period of human life which is exempt from it; death *may* come soon to the young; it *must* come soon to the old—that is the difference. And after all is death an event so greatly to be feared?

(4) dico, dicis, dicit possum, potes, potest
dicimus, dicitis, dicunt possumus, potestis, possunt
evenio, evenis, evenit
evenimus, evenitis, eveniunt

Potest is an irregularly declined verb, a compound of *podtis* (*pote*) and *est*.

Inquit is a defective verb.

Fruebar is a deponent verb.

SECTION II.

1. Translate into Latin:—

(*a*) For I know the (just) control and evenness of your mind.
(*b*) This is the custom in use among philosophers.
(*c*) He died the year before I was Censor.
(*d*) Sophocles composed tragedies to extreme old age.
(*e*) I discover four causes for the apparent misery of old age (translate—Why old age may seem wretched).

(*a*) Novi enim moderationem animi tui et aequitatem.
(*b*) Sic enim inter philosophos fieri solet.
(*c*) Anno ante me censorem mortuus est.
(*d*) Sophocles ad summam senectutem tragœdias scripsit.
(*e*) Reperio quattuor caussas, cur senectus misera videatur.

SECTION III.

1. Give the dative and accusative singular and plural of—*versus*, *liber*, *vita*, *senex*, *studium*, *vir*. What cases in Latin nouns have often the same endings?

2. *Uteretur*. What sort of verb is this? Give similar ones.

3. Give the Latin for two, the third, twelve, eighteen, twenty, the twentieth, a hundred, the hundredth, a thousand, the thousandth.

4. Give two verbs, with their meanings, compounded from *ferre*, *legere*, *audire*, *cedere*. Classify the conjugations of each of the above verbs.

5. How many classes of adjectives are there in Latin? Write out the singular of *bonus*, and the plural of *facilis*.

(1)

Versui	versum	versibus	versus
libero (child)	liberum	liberis	liberos
libro (book)	librum	libris	libros
līber-o-æ-o		liber-is	(adj. free)
liber-um-am-um		liber-os-as-a	
vitae	vitam	vitis	vitas
seni	senem	senibus	senes
studio	studium	studiis	studia
viro	virum	viris	viros

In the first declension: the gen. and dat. sing., dat. and abl. plural, have often the same endings.

In the second declension: the dative and abl. sing., dative and abl. plural.

In the third declension: the dative and abl. sing., nom. and accus. plural, dative and abl. plural.

In the fourth declension: the gen. sing., nom. and accus. plural, dative and abl. plural.

In the fifth declension: the gen. and dat. sing., gen. and dat. plural, nom. and accus. plural, dative and abl. plural.

In all declensions, nom. and voc. sing. and plural.

(2) Deponent. Fungor fruor utor vescor loquor miror adorior, etc.

(3) duo, tertius, duodecim, octodecim or duodeviginti, viginti, vicesimus, centum, centesimus, mille, millesimus.

(4) Confero, compare: aufero, take away.
colligo, collect: deligo, choose.
exaudio, overhear: obedio, obey.
discedo, depart: concedo, yield.

Legere and cedere are of the third conjugation, consonantal stems, so is ferre for fer-ere.

Audire is of the 4th conjugation, -ī stems.

(5) Two. (1) Those of three terminations -*o* and -*a* stems.
(2) (*a*) Those of two terminations, consonantal or -i stems.
(*b*) Of the -i stems some have distinct masculine, fem., and neut. forms in the nom. sing., as acer, acris, acre.
(*c*) Others have no distinctive form for the neut. nom. sing., as *verax*.

N.	bonus	bona	bonum	faciles	facilia
V.	bone	bona	bonum	faciles	facilia
A.	bonum	bonam	bonum	faciles	facilia
G.	boni	bonæ	boni	facilium	
D.	bono	bonæ	bono	facilibus	
AG.	bono	bona	bono		

(To be continued.)

—o—

Pupil Teacher Examination Papers. (Scotland.)

28TH APRIL, 1888.

END OF FIRST YEAR.

FIRST PAPER.

(*Two hours and a half allowed for this Paper.*)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word 'Acknowledgment.'

Write in small hand, as a specimen of copy-setting, the sentence 'Kind hearts are more than coronets.'

Arithmetic.

MALES.

1. From the sum of $\frac{1}{2}$, $\frac{3}{4}$, $\frac{5}{6}$, and $\frac{7}{9}$, take the difference between $\frac{2}{3}$ of $3\frac{1}{5}$ of $2\frac{1}{2}$ of $\frac{1}{12}$ and $\frac{5}{12}$.

$$(a)\ (\tfrac{1}{2} + \tfrac{3}{4} + \tfrac{5}{6} + \tfrac{7}{9}) = \frac{18 + 27 + 30 + 28}{36} = \tfrac{103}{36}$$

$$(b)\ \tfrac{2}{3} \text{ of } 3\tfrac{1}{5} \text{ of } 2\tfrac{1}{2} \text{ of } \tfrac{1}{12} = \tfrac{2}{3} \times \tfrac{16}{5} \times \tfrac{5}{2} \times \tfrac{1}{12} = \tfrac{16}{36}$$

$$(c)\ \tfrac{103}{36} - (\tfrac{16}{36} - \tfrac{15}{36}) = \tfrac{102}{36} = \underline{2\tfrac{5}{6}}.\ \text{Ans.}$$

2. A can do a piece of work in 5 days, B in 9, and C in 10; how long should they take to do it if they all work together?

A does $\frac{1}{5}$ or $\frac{18}{90}$ in 1 day.
B „ $\frac{1}{9}$ „ $\frac{10}{90}$ „
C „ $\frac{1}{10}$ „ $\frac{9}{90}$ „
A, B, and C do $\frac{37}{90}$ „

∴ They will do the whole in $\frac{90}{37}$ or $\underline{2\frac{16}{37}}$ days. Ans.

3. The half of $\frac{3}{5}$ of a block of buildings was sold for £625·275; by-and-by, when the valuation of the whole property had fallen by £480, what should be paid for $\cdot\dot{7}$ of it?

(*a*) $\frac{1}{2}$ of $\frac{3}{5} = \frac{3}{10}$. ∴ value of the whole = £625·275 × $\frac{10}{3}$

" " = £2084·25

(*b*) $\cdot\dot{7}$ or $\frac{7}{9}$ of (£2084·25 − £480 = $\frac{£1604·25 \times 7}{9}$

" = $\frac{£11229·75}{9}$

" = £1247·75

" = £1247 15s. Ans.

4. Take (by decimals) $\frac{6}{7}$ from the product of ·009 and 137·281.

137·281
·009
1·235529000000
$\frac{6}{7}$ = ·857142857142……
$\cdot 378386\dot{1}4285\dot{7}$. Ans.

FEMALES.

1. Find, by Practice, the rent of 918¼ acres of land at £24 17s. 2d. per acre.

	£	s.	d.		
	918	5	0	=	price of 918 ac. at £1 each.
			4		
	3673	0	0	=	" " £4 "
			6		
	22038	0	0	=	" " £24 "
10s. = $\frac{1}{2}$ of £1	459	2	6	=	" " 10s. "
5s. = $\frac{1}{2}$ of 10s.	229	11	3	=	" " 5s. "
2s. = $\frac{1}{5}$ "	91	16	6	=	" " 2s. "
2d. = $\frac{1}{12}$ of 2s.	7	13	0½	=	" " 2d. "
	22826	3	3½	=	" " £24 17s. 2d. ea.

2. Make out and receipt a bill for :—6 cheeses, each averaging 13¼ lbs. at £98 per ton; 3 hams, each weighing 18½ lbs., at 9½d. per lb.; 2 firkins of butter, weighing 210 lbs., at £5 7s. 4d. per cwt.; 3,000 eggs at 10¼d. per dozen.

Ayr, 28th April, 1888.

Mrs. Scott,

Bought of Mr. Millar.

	£	s.	d.
6 cheeses, each 13¼ lbs., at £98 per ton … …	3	9	6¾
3 hams, each 18½ lbs., at 9½d. per lb. … …	2	3	11¼
2 firkins butter (210 lbs.) at £5 7s. 4d. per cwt. …	10	1	3
3,000 eggs at 10¼d. per dozen … … …	10	13	6½
	£26	8	3½

Paid 28/4/88
John Millar.

3. Take the sum of $2\frac{5}{9}$, $\frac{5}{3}$ and $3\frac{4}{7}$, from the difference between $3\frac{1}{2}$ and $18\frac{5}{11}$.

$$(18\tfrac{5}{11} - 3\tfrac{1}{2}) - (2\tfrac{5}{9} + \tfrac{5}{3} + 3\tfrac{4}{7}) =$$
$$(18\tfrac{10}{22} - 3\tfrac{11}{22}) - (2\tfrac{35}{63} + \tfrac{105}{63} + 3\tfrac{36}{63}) =$$
$$14\tfrac{21}{22} - 7\tfrac{50}{63} = 14\tfrac{1323}{1386} - 7\tfrac{1100}{1386}$$
$$= 7\tfrac{223}{1386}.\ \text{Ans.}$$

4. Find the G. C. M. of 408, 357, 612, and 544.

(*a*)
7 | 357 | 408 | 1
| 357 | 357 |
51

(*b*)
51 | 612 | 12
| 612 |

(*c*)
1 | 51 | 544 | 10
34 | 51
17 | 34 | 2
34

∴ 17 = G. C. M. Ans.

Grammar.

1. The following passage is to be analysed in detail :—

'They were *all knights* of fame and had seen service in *most* of the wars of their time, but had now met in their old age, *where* in their youth they had parted many *years before.*'

2. Parse the words in italics, and also the word 'both' in the following sentences :—

(*a*) 'They were *both* soldiers.'
(*b*) 'He was *both* a soldier and a sailor.'
(*c*) 'You cannot *both* read at once.'
(*d*) 'You cannot *both* read and eat at the same time.'

ANALYSIS.

Sentence	Kind	Connect.	Subject	Predicate	Object	Extensions
1. They were all knights of fame	Principal		they all	were knights of fame		
2. and (they) had seen service in most of the wars of their time	Principal	and	(they)	had seen	service	in most of the wars of their time (time)
3. but (they) had now met in their old age	Principal	but	(they)	had met		in their old age (time)
4. where in their youth they had parted many years before.	subord. adv. of 'place' to 3	where	they	had parted		in their youth (time) many years before (time) where (place).

PARSING.

All—indef. num. adj., predic. of 'they.'
most—adj. super. deg., mod. (wars) or used as a noun obj. gov. by 'in.'
knights—com. noun, mas., plur., nom. after 'were,' in appcs. with 'they.'
where—subord. conj., introd. subord. adv. sent. of 'place' and mod. 'had met.'
years—com. noun, neut., plur., obj. of 'time.'
before—prep. gov. (time), used as adj. qual. 'years.'

Both.

(*a*) Adj. qual. 'they.'
(*b*) Conj., cor-rel. with 'and.'
(*c*) Indef. adj. pron., qual. 'you.'
(*d*) Conj., cor-rel. with 'and.'

3. How do you distinguish between a clause and a sentence, and between a clause and a phrase? Give several examples of each.

A 'sentence' is a combination of words forming a complete thought; as, they are wearied; he has written; she gave orders.

A 'clause' is a subordinate member of a sentence containing a finite verb; as, when he comes; after we knew; which was understood.

A 'phrase' is any combination of words which does not contain a finite verb expressed or understood; as, in coming; on returning; before going home.

4. What do you mean by 'analysing' a sentence? Can a *word* be analysed?

Analysis is the division of a sentence into its primary elements, as the separating of the grammatical subject with its adjuncts from the predicate verb with whatever is attached to it as object, complement, or adverbial adjunct.

A *word* may be analysed by showing the root if a primitive; or root, prefix or affix, if a derivative; or by separating its parts if a compound.

SECOND PAPER.

(Two hours and a half allowed for this paper.)

Geography.

1. Draw a map of Ireland, indicating the *chief* physical features.

2. Explain the terms river-basin and watershed. Describe the principal river-basins of Scotland with their watersheds.

A *river-basin* is the whole area which supplies the water to a river, and the *watershed* is the slope between the ridge of the basin and the river itself.

The eight most important basins of Scotland are those of the Tay, Tweed, and Solway, Forth, Dee, and Don, Spey, Clyde, Linnhe basin, and Moray basin.

Three of these lie north of the Grampians, viz., the Moray basin and the basin of the Dee and Don on the east side, and the Linnhe basin on the west; and their united areas comprise almost the whole of the district known as the Scottish Highlands. Just to the south of these lie the basins of the Tay and Forth on the east side and that of the Clyde on the west. These touch each other and are separated from the former three by the Grampian chain and from the Tweed and the Solway basins by the Lammermoor and Lowther ranges. The first is separated from the second by the Ochil Hills, and the second from the third by the Campsie Fells. The basins of the Tweed and Solway constitute the southern Highlands. They are separated from England by the Cheviot range and from each other by the Lowthers; while the Tweed basin is separated from the Forth by the Lammermoors, and the Solway basin from the Clyde by the Lowther range.

3. Where are the following places situated, and for what is each notable:—Hull, Dunfermline, Macclesfield, Balmoral, Huddersfield, Kilmarnock?

Hull, on the Humber, in Yorkshire, is the fourth commercial city in England; its annual exports exceed £12,000,000 sterling, being the great outlet for the manufactures of the West Riding.

Dunfermline, in Fife, near the Firth of Forth, is a place of great historical interest, and noted for its linen manufactures. Charles I. was born here, and Bruce was buried in its Abbey.

Macclesfield, in Cheshire, employs 10,000 hands in the silk-weaving.

Balmoral Castle, the Highland residence of the Queen, is in Aberdeen, on the river Dee.

Huddersfield, in Yorkshire, in the basin of the Aire, is a great seat of the woollen trade.

Kilmarnock, in the middle of Ayrshire, is the largest town in the County, and has numerous manufactures.

History.

(Answer *any two* of the following questions.)

1. Give an account of Cæsar's invasions of Britain.

Cæsar first invaded Britain in B.C. 55. He landed on the coast of Kent and caused the Britons to submit to him. He returned to Gaul in a short time and in the following year (B.C. 54) he again invaded Britain. He found the Britons united under Cassivellaunus. Cæsar, however defeated the Britons, stormed a fort at Verulam and compelled them to give hostages. He then left with his prisoners of war, who were sold for slaves.

2. Describe the policy and Government of King Canute.

Canute's policy was one of peace. He proved himself to be a wise and just ruler. He maintained the English laws and ruled by them impartially. The country was divided into four earldoms—Northumberland, Mercia, East Anglia, and Wessex, a prominent noble being appointed to rule each under the king. He forced a king of Scotland to submit to him and ruled with a firm hand, not only England, but Denmark, Norway, and part of Sweden.

3. What do we know of the religion of the ancient Britons? Whence is our knowledge derived?

The religion of the ancient Britons, called Druidism, was a gloomy, mysterious, and superstitious paganism with rites practised in dark groves of oak, with human sacrifices and doctrines left unwritten and communicated only to a few persons. The Druids venerated the oak and mistletoe and believed in several gods.

Our knowledge of the religion of the ancient Britons is derived from Cæsar's Commentaries.

4. Give a full account of King Alfred, his life and his work as soldier and as legislator.

Alfred was born at Wantage in 849 and was twenty-two years of age when he became king (871). He had then as hard a task before him as ever any king has had—to reconquer his country and to re-civilize his people. For seven years he fought the Danes with varying success, but in 878 he was driven to the marshes of Athelney. Here he bided his time for striking a decisive blow, meanwhile making several successful sallies against the invader. In the guise of a harper he is said to have gained a correct knowledge of the Danish numbers and plans, and falling upon his enemies at Ethandune he gained a complete victory. The treaty of Wedmore gave the Danes a large part of land to re-people, which district got the name of Danelagh. Turning his attention to the sea he organised a powerful fleet to repel invasions. From 878 till 891 his dominions were at peace and during these years he rebuilt towns, churches, and monasteries. Schools were founded and scholars were invited from abroad to instruct the students; traders and craftsmen from the Continent revived expiring commerce, and introduced new arts and manufactures. Himself a scholar, he encouraged the revival of learning by his own labours and example. To facilitate the administration of justice Alfred introduced or revived the division of the whole kingdom into counties, hundreds, and tithings; the laws of his predecessors were collected and remodelled. His great designs perished with him in 901.

Composition.

Write the substance of the passage read to you; or a short letter describing how you spent your last holiday.

Glasgow, 28th April, 1888.

Dear Sir,

My last holiday was spent in a most enjoyable manner, for it was spent in the place hallowed by association with the life of our national poet, Robert Burns.

Having purchased a return-ticket at St. Enoch's station I was whirled away through Renfrew and Ayrshire to Ayr, the county town which Burns has characterised as one—

'Wham ne'er a toun surpasses
For honest men and bonnie lasses.'

At the town were found a long array of conveyances of all sorts and sizes, whose drivers were quite ready to carry us to 'The Monument' for a shilling a head. Along with some other holiday-makers, I took a seat, and away we rattled past a number of villas nestling among gardens and trees, past the famous race-course, and along a well-kept country road till we reached the cottage—the auld clay biggin—where Burns was born. Entering our names in the visitors' book, which bears the autographs of some of the most famous men in the world, we made a thorough inspection of everything worth looking at, and then repaired to Alloway Kirk—the scene of the most vivid picture in 'Tam o'Shanter'—whence we directed our steps to 'The Monument,' from the summit of which we had a splendid view of sea and land. Alloway Bridge, which the witches dared not cross, had to be seen, and after half-a-day had been spent in this vicinity, we returned to ramble along the streets and esplanade of Ayr, and with a last fond look at the 'Auld' and the 'New Brigs' we left for Glasgow, with an ample fund for future talk or reflection.

I am, dear Sir,
Your obedient servant,
THOMAS A. HUME.

(To be continued.)

Publications Received.

Cassell and Co.—

Slöjd. By Emily Lord.

Cassell's Coloured Historical Wall Sheets—Queen Elizabeth at Tilbury Fort.

Houlston and Sons—

The Beautiful Valley Series of Sermons to Children. Nos. 3 and 4.

Jarrold and Sons—

The Young England School Series. Standards 1 to 7.

Johnston, W. and A. K.—

Pictorial Astronomical and Geographical Diagrams (with Handbook).

Orosian Geography. By J. McCubbin and Daniel T. Holmes.

Longmans and Co.—

Longmans' School Grammar. By David Salmon.

Macmillan and Co.—

Arithmetical Exercises, &c. By H. S. Hall, M.A., and S. R. Knight, B.A.

Die Karavane (Hauff). By Herman Hager, Ph.D.

Moffatt and Paige—

The Aldine Reciter. By A. H. Miles.

Murray, John—

A Readable English Dictionary. By David Milne, M.A.

Nutt, David—

A Stepping-stone to French Translation. By B. Probst.

Philip, G., and Son—

Philips' Handy-Volume Atlases: British America; Australasia.

Smith, Elder and Co.—

The Cornhill Magazine. July and August.

Whittaker and Co.—

Drawing and Designing. By C. G. Leland.

Williams and Norgate—

La Fontaine's Fables Choisies. By Leon Delbos.

Publications Reviewed.

Some Contributions to the Science of Education. By William H. Payne, A.M. London: Blackie and Son.

The work before us has the credit of being the most authoritative contribution to the science of education in America. It is the effort of an educationist of high repute who approaches his subject with the double qualification of philosophic training, combined with much practical experience in the art of teaching. The object of the author, according to his own statement, has been 'to encourage among teachers the habit of serious reflection upon some of the greater problems in education to the end that they may find a new delight in an occupation otherwise monotonous and uninspiring.' Mr. Payne treats with great reverence the educational theories of the past, and views with almost harsh suspicion the modern notions which have been promulgated by Rousseau, Spencer, and Bain. At the same time there is throughout the essays an approval of their doctrine; especially is this manifest when methods of teaching are justified by reference to the principles of mental science.

'I am in nowise disposed to break with the past, and to dream of an approaching revolution in educational theory and practice,' says Mr. Payne. 'A better future for the schools is doubtless fore-ordained, but this is to be a growth, slow and halting, like all other forms of growth, and a growth out of past conditions and products. Since the human mind has been studied by the acutest thinkers of all ages and countries, and since the wisest and the best of men have been working at the educational problem under all conceivable conditions, I find it impossible to believe that all this mighty effort must go for naught, and that educational science must be constructed *de novo*.'

The reader necessarily asks the names of these educational revolutionists who state 'basic principles each of which expresses the half of a truth, but with such distortion and exaggeration as to be a virtual untruth.' The author shall answer for himself:

'Ancient education was concerned almost exclusively with accumulated knowledge, that is, with knowledge which could be acquired through the interpretation of language. We may properly and conveniently call this secondhand knowledge. The extreme modern theory is that learning is a process of discovery or of re-discovery. To employ the conceit of Rousseau, the pupil shall not learn science but shall discover it. Throw aside books, take nothing for granted, assume that the world of knowledge is unexplored, and then rise to the comprehension of the universe by repeating the experiences of the race. This, in brief, is the latest theory of learning and teaching. Locke was unconsciously the author of it . . . . and Spencer has attempted, by specious sophistry, to establish it on a basis of philosophy.'

We must refer our readers to Mr. Herbert Spencer's little work on Education for an answer to this violent and, as we think, uncalled for attack. At the same time we ask them to consider the following statement of Mr. Payne: 'The most of the science that we learn we must learn as literature, and not experimentally, and it is questionable whether, for the ends of culture, secondhand knowledge (*i. e.* from books) is not better than first hand knowledge. For practical or professional uses physiology should, no doubt, be learned in the dissecting room and in the physiological laboratory; but for the purposes of general culture it should be learned from books.'

Now let any teacher of physiology ask himself what kind of physiological science can be learned from text books alone? Is it not the superficial smattering of undigested knowledge which, whilst it is held, ministers chiefly to the vanity of its possessor, and when it is partly forgotten leaves the mind struggling with scraps of disconnected facts which had better never been accumulated. And this form of acquisition is designated by Mr. Payne 'Culture,' the culture surely arising from half knowledge, superstition and mental indolence.

In the chapter on Lessons from the History of Education we gladly note a willingness on the part of the author to acknowledge the value of the modern theory of education. Taking for text Matthew Arnold's statement that 'the ideal of a general liberal training is to carry us to a knowledge of ourselves and the world,' he adds, 'the two factors in this conception are the world *without* and the world *within*, the one discoverable by observation, the other by reflection. The historical fact that I wish to call attention to is, that the current of opinion has flowed first towards one of these regions of knowledge and then, by a recoil movement, towards the other. We of to-day are either promoting the recoil towards realism or physical philosophy, or are borne along in the current in spite of our resistance. The indications of fact are not to be mistaken. Object teaching, sense training, the culture of the observing powers, manual training, are positive marks, while the warfare against the classics, the discredit thrown upon metaphysics and a relaxing of faith in ideals and in whatever cannot be weighed and measured are negative indications of the same fact. . . . . In the meantime the man of one idea will continue to lift up his voice. On the one side there will be prescribed an exclusive intellectual diet of Greek and Latin and mathematical roots, and on the other of bugs, butterflies, and botanical roots. But for ourselves and our children we will order a mixed diet. Our sons shall be able to read the Iliad and to ANALYSE AIR, EARTH AND WATER, and our daughters to read Dante and to make bread and cook a beefsteak. Our educational creed shall embrace both the trained head and the trained hand.'

With this enunciation of educational system we heartily agree, at the same time we have difficulty in reconciling it with the principles of educational science hitherto set forth by Mr. Payne. The scope and methods of the education the parent desires for his children do not harmonize with the principles of the professor.

In the chapter on the Pestalozzian maxim 'Proceed from the known to the unknown,' the author starts by asserting 'that this well worn " principle " is a bit of educational cant that passes current to save the labour of thinking.' Again, in the wide application of this maxim to educational processes, it is termed 'nonsense and cant.' The author further states 'this maxim is often employed to justify the constructive or synthetic method of teaching geography, according to which the pupil proceeds from schoolyard to township, from township to county, from county to state, from state to nation, from nation to continent, from continent to hemisphere, and finally to the globe. But . . . . this specious method is false, is absolutelywithout scientific justification.' Now this is a specific charge, and the ground is familiar. Instead of attempting to combat the position ourselves we will adopt a more effective method of warfare. Prof. Payne shall answer himself. Among his concluding remarks on this chapter are the following: 'I do not believe this dogma (maxim) can be employed with any certainty, save in cases where language is the medium of instruction.' In a previous chapter, pp. 91 and 93, the Professor argues that geographical knowledge is almost entirely inaccessible by direct means, and is acquired almost exclusively through language. So that we are now to accept the conclusion that geographical knowledge is to be obtained in accordance with the maxim the use of which just before has been denounced as 'specious, false, and absolutely without justification.'

In concluding a brief preface Prof. Payne states that 'in bringing these essays together into a volume I have tried to cancel repetitions that almost invariably appear in such a series of detached papers; but after all my care some such repetitions of thought, expression and illustration remain to tax the indulgence of the reader.' There are repetitions, it is true, of statements long held by our foremost educationists of such an excellent nature that they cannot be too frequently repeated. At the same time there are serious contradictions some of which we have dared to indicate.

Practical Papers on Digesting Returns into Summaries. By George E. Skerry. London: Simpkin, Marshall and Co.

This is a selection of twenty-four examination tests in the work of digesting and tabulating statistical information, with hints for the guidance of students. The exercise is a valuable and necessary one to many besides Civil Servants, and the suggestions given in this little book are very useful. The papers have been actually set in the Civil Service examinations, and therefore afford excellent practice for would-be competitors.

Reynolds's Experimental Chemistry. Part IV. Organic. London: Longmans, Green and Co.

This completes the author's well known course of experimental chemistry, and provides the student with a practical, as well as theoretical, introduction to the great organic division of the science. Those who have used the former parts are already familiar with the method Professor Reynolds has successfully employed in the inorganic branch of the subject. In his own words, he has sought to help the student to acquire a sound knowledge of the facts and principles of the science without overburdening him by undue detail. The book consists of 21 chapters of about 18 pages each. Minute instructions are given for making 150 experiments, which are intended to introduce to the student's observation all that it is really essential he should know in a first course on the subject. We have no hesitation in saying that this small manual is a thoroughly sound and honest book. A student who worked through it, as its author instructs him to do, would gain a real insight of what organic chemistry is. The book could be read through in a week; but if the 150 experiments are carefully done, a student who spends four hours a week for a year at the subject will not have wasted his time. We have not compared the table of contents with the requirements of the various examination boards. Should the subjects demanded be found in this book, a student could hardly find a better guide; and in any case it will be excellent upon all the matters it takes up. We very strongly recommend Professor Reynolds's 'Experimental Chemistry' as a whole, and especially this last contribution.

Bell's Reading Books. The Life of Columbus. By Sarah Crompton.

The Talisman. By Sir Walter Scott. Abridged for use in Schools. London: George Bell and Sons.

These are the two latest issues of an excellent series of short books. Miss Crompton tells the deeply touching story of Columbus, his perseverance in difficulty, his noble moderation in the hour of success, his patience under misfortune, in simple language and pleasing style. Children cannot well look upon reading as a disagreeable task if their lessons are given from a book like this, which has as deep an interest as attaches to a romance of fiction. Some chapters are added on Alonzo de Ojeda, Vasco Nunez, and Pizarro, companions and followers of Columbus; but the story of the Conquest of America by the Spaniards is so full of cruel deeds and treachery, that it is hardly pleasant reading.

'The Talisman' is for children one of the most attractive of Sir Walter Scott's novels; and this edition will be welcomed in many schools. It is abridged only in order to bring it within the compass of a school reading book, and this does not involve other alteration of the text than the occasional insertion of a paragraph or two to connect portions of the tale.

Civil Service Arithmetic. By R. Johnston, F.R.G.S. London: Longmans and Co.

As this book has passed into its twentieth edition, the public at any rate have accepted it as useful; and we need therefore add very little about it.

In the preface to this new edition the author draws attention to his treatment of Circulating Decimals, as well as Simple Proportion, and one or two other subjects.

We are glad to see Proportion, both Simple and Compound, taught as such, but we should doubt the wisdom of ignoring the unitary method altogether.

Other scales than the denary are carefully explained. and the work is not only full of examples on each method explained, but is supplemented by some competitive examination papers set by the Civil Service Commissioners.

Longmans' New Reading Sheets. London: Longmans, Green and Co.

Every one who has seen the primer to Longmans' Readers will be aware of the care employed in their compilation and the scientific basis upon which the lessons are built. These sheets are eight in number and are a reproduction of the primer on linen printed on both sides, and suspended on rollers. They can be easily seen by the largest class. Each sheet after the first contains a lesson in word making, together with one or two words which are to be learnt by sight and sound, the pattern being given. These words made and given are then combined in a reading lesson, and as the words are supposed to have been properly learnt, phrasing is introduced from the beginning. The lessons are thoroughly well prepared, and the get-up of the sheets is all that can be desired.

White's Grammar School Texts: Virgil's Æneid XI. London: Longmans and Co.

Dr. White's library of Latin and Greek texts is growing apace. There is nothing new in the method of arrangement in this volume from any of its predecessors that we can see. The notes and information is all given under the different words in the vocabulary at the end of the book. Whether this is the best plan or not we will leave others to say; but there is no doubt that it has led the learned editor to an exhaustive study of the Latin language, which is very apparent in the later editions of his admirable dictionary. The etymology contained in the vocabulary is its most important feature, and we believe that quite young students are soon fascinated with this study.

We may give as a proof of how thoroughly this particular book is done, that its vocabulary covers double the space occupied by that to the first book of the Æneid, whereas the book itself is only some fifty lines longer.

(a) Infants' Drill.

(b) Infants' Needlework: Instructions for the Knitting Frames. By Mrs. Hibbert. London: J. Marshall and Co.

Mrs. Hibbert is a successful infant school teacher in Shrewsbury, and she has given the benefit of her long experience of teaching infants to others in a series of little handbooks, of which the two named form a part. The first manual consists of a letter-press description of a number of movements suitable for exercises for infants, whether in seats, desks, or on galleries. The movements are simple, yet very effective, and must be conducive to good order and discipline. The book is well worthy the attention of all infant teachers.

As one of a series of varied occupations Mrs. Hibbert has introduced knitting frames. Manual (b) gives instructions for their use, prices of various materials with the amount required, making the directions of great practical value.

Modern Gymnastic Exercises. By A. Alexander. London and Liverpool: George Philip and Son.

This book has been published for the use of those members of Physical Recreation Classes who cannot avail themselves of professional teaching. It consists of a series of movements with light dumb bells, bar-bells, and Indian clubs, set to simple music, together with a number of directions for exercises on the parallel and horizontal bars, the trapeze, swinging rings, and the vaulting horse. There is some danger of youths overtaxing themselves when turned into a gymnasium alone, but moderate exercise in such a place must always have a beneficial effect upon the physique, and we are quite sure that Mr. Alexander is a safe guide to follow. If his advice be followed no evil results will ensue. We can as cordially recommend the book under notice as we formerly recommended the book of exercises for schools, and it will be possible for many teachers to introduce some of these exercises into the ordinary movements in use every day.

Lives of Great and Good Women. London and Edinburgh: W. and R. Chambers.

Messrs. Chambers have conferred upon every one engaged in the education of girls a lasting favour by the publication of this highly interesting and attractive volume. With girls themselves it is sure to be a favourite. Twenty-six short, crisp, instructive and entertaining biographies of some of the best, bravest and most intelligent of the world's women are here brought together, and no girl can rise from their perusal without better aspirations and more lofty purposes than previously. It will be an attractive gift book during this and future years.

Poynter's Drawing for the Standards. Books 25—28. London: Blackie and Son.

The books Nos. 25—28 complete the series. They include freehand and geometrical requirements for Standard VII. Book 25 has eight examples of single objects or groups of objects to be used preparatory to studying light and shade from the actual model and cast. They are well adapted for the purpose. Clear directions for the special objects and general remarks on shading accompany the examples. Books 26—28 comprise the further plane geometry, and the plans and elevations of rectangular and circular solids which complete the elementary school course. The whole series is well worthy the attention of teachers, and a child who has thoroughly mastered it will have the elements of technical instruction at command to enable him to proceed to any branch of mechanical work with an intelligence not otherwise attainable.

Natural History Object Lessons. By G. Ricks. London: Wm. Isbister.

The value of a book of object lessons depends mainly upon the fulfilment of three conditions:—

(1) The careful selection of suitable and accurate information.

(2) The arrangement of the collected material in a logical series both as to the lessons as a whole, and the parts into which each lesson is divided.

(3) The amount of guidance afforded the teacher in his presentation of knowledge to his class in one or more of the following ways:—

- (*a*) By apt illustration both in statement and picture.
- (*b*) By frequent appeal to the associations of related matter by means of comparison and contrast.
- (*c*) By the indication of modes of stimulating the scholars to mental activity, so that what is taught may not only be interwoven with matter already known, but may remain a permanent possession as valuable for further acquisition as for present enlightenment.
- (*d*) By showing how to train and develop the habit of expecting and recognising the relationships which everywhere exist in the world of natural objects with which the pupil is in daily contact.

Mr. Ricks devotes one half of his book to the material out of which the object lessons are to be made. The chapters on plant structures are admirable; the illustrations are excellent, and the matter is selected with a teacher's skill and a scientist's knowledge. The remaining half of the work consists of *specimen* lessons. The arrangement of these in systematic courses for the various classes is left to the teacher. As a consequence we find the lesson on 'Paws and Claws,' followed by a lesson on the 'Cocoa-nut;' lesson iii. is on 'Cotton and Wool,' and lesson iv. on 'An Egg.' It would have increased the value of his work immensely if Mr. Ricks had arranged these lessons with more system. Young teachers need especial guidance in this systematic arrangement of their object teaching. The lessons embodying a comparison between allied structures will be very helpful and suggestive: the 'outlines' are at times mere skeletons, and will need very skilful dressing in order to make them attractive; see, *e.g.*, the outline lesson on 'An Egg,' p. 182. We cannot speak too highly of the model sketches for the black-board at the end of the book.

Brave Men of Old. By Robert Fisher, M.A. London and Manchester: Jno. Heywood.

This little volume consists of twelve simple narratives of the minor prophets of the Old Testament. It will help many persons who have not leisure to peruse larger works to understand more clearly the character and the writings of these 'brave men of old,' and to take a more intelligent interest in the books and the lessons they were meant to teach.

Little Favourites. Juvenile Poems Collected and arranged by Bella Gall, Teacher. London: Hamilton Adams and Co.

The title fairly describes this booklet. The short pieces it contains are mostly well-known and are from pens of well-known writers. We have Mary Howitt's 'Buttercups and Daisies' Campbell's 'Poor Dog Tray' and several of Ann and Jane Taylor's verses. We hardly understand whether the book is intended for use by children themselves, or for the teacher's use. If the latter, the simple explanations of words and phrases must be needless; and if the former, the book is not substantial enough. If it is meant for preparing for code requirements, as a prefatory note suggests, many of the poems are unsuitable, for they are distinctly religious. We do not know why some of the pieces have been curtailed, as Miss Ingelow's 'Seven Times One,' Mrs. Alexander's 'Little Birds,' and Mrs. Hemans' 'Better Land.'

Songs for School and Home Use. By Alfred S. Hill. Third Edition. Manchester: J. Heywood.

A useful collection of simple melodies, with appropriate words, suitable for all classes of schools.

Silkworms ('Young Collector' Series). By E. A. Butler, B.A., B.Sc. London: Swan Sonnenschein and Co.

In this nicely got up little volume Mr. Butler has presented us with a pleasantly written and most instructive account of Silkworms of all kinds, comprising a brief outline of their history from the time of their first domestication in the remote ages of antiquity until the present day, a sketch of their development from the egg to the perfect insect, a description of their internal and external anatomy, and a few practical suggestions with regard to their management. The book is a thoroughly good one. Mr. Butler has carefully avoided two of the great temptations which beset the zoological writer: the one, to be unduly scientific, and to adopt language 'not understanded of the people;' the other, to be interesting and amusing at the expense of accuracy. And yet he has contrived to pack a wonderful amount of sound information into a small compass, and to treat his subject with an exhaustiveness leaving little or nothing to be desired. A word of special praise is due to the singularly happy manner in which he has described the anatomical peculiarities of silkworms in the various stages of their development. The illustrations are not numerous, but are without exception well executed and accurate; and, both to silkworm breeders and to all others interested in entomological subjects, the book is one which we can most thoroughly recommend.

British Birds, their Nests and Eggs. By W. Harcourt Bath. London: Swan Sonnenschein and Co.

A little volume belonging to the same series as the preceding; but unfortunately we cannot speak of it in terms of similar praise. Mr. Bath has not the knack of imparting information in the attractive manner so essential to all who write upon natural history subjects for the benefit of general readers. He mentions a few disconnected facts with regard to a bird, perhaps gives a superficial description of its plumage or its eggs, and then passes on to the next; and more than this is required by the readers for whom the book is intended. Nor is Mr. Bath either consistent, or in all cases accurate. He makes no mention, for example, of the slight but constant distinctions which separate the marsh tit from the cole tit, although many birds which not even the merest novice could fail to recognise are somewhat minutely described. The bullfinch, we are told, is 'nowhere found in abundance'; many farmers and gardeners could tell a different tale. The curlew is described as a rarity, and the woodcock as a greater rarity still. The nest of the long-tailed tit is stated as 'generally fixed in the fork of some tree,' whereas it is more commonly situated in a low, thick bush; the bird itself is described as congregating during winter in large flocks, whereas the members of each family only live together; and, most curious blunder of all, the redbreast is given as 'one of our greatest benefactors.' Certainly the bird is not in any way mischievous, but why it should thus be glorified above the starling, the rook, the nightjar, the kestrel, and the owls—whose beneficial work is completely ignored—passes our comprehension altogether. The most valuable portion of the book is undoubtedly the short appendix, on the collection and preservation of birds, by Mr. R. Bowdler Sharpe, which, as is only to be expected from the pen of so high an authority, is all that can be desired. Full instructions are given for skinning, mounting, and arranging specimens for the collection, and—we are delighted to see—the practice of indiscriminate slaughter, even for such a purpose, is reprehended in the strongest terms. Even this portion of the book, however, is disfigured by six of the very worst illustrations which it has ever been our lot to see, and we can only regret that matter so excellent as Mr. Sharpe's letterpress should not have appeared under more favourable conditions.

A Manual of the Type-Writer. By John Harrison. London: Isaac Pitman and Sons.

This little book describes the form and working of one of the most marvellous instruments of the day—the Remington Typewriter. There are of course other mechanical writers in existence besides the Remington, but the various types of this instrument seem by their general excellence and by their extensive adoption in all parts of the business world to be *facile principes*, and almost to merit the mode in which they are alluded to in the title of the manual now under review as '*the* Type-Writer.'

Ever since writing began there has been a race between the pen and the tongue; and the pen has proved thus far the laggard. Shorthand has of course done wonders on the pen's behalf, but even the swiftest shorthand-writer is beaten by a rapid talker in anything like a sustained effort. To the general public too the phonetic symbolism of shorthand is as a sealed book. Not so the symbols registered by the type-writer. Clearness and legibility are their main features; and all persons—and they are legion—who have been hampered and delayed by the villanous hand-writing of their correspondents will welcome the time when mechanical type-writing becomes universal: at any rate in business communications. In speed the type-writer cannot of course compete with shorthand, but a speed of 40 words per minute is by no means uncommon and for sharp bursts a speed even of twice that is not unknown. What this means may be more fully appreciated when one considers that the ordinary rate of writing in a fairly legible style is about fifteen words per minute, if due attention is paid to dotting the *i's* and crossing the *t's*. In addition to legibility therefore, speed is a merit possessed by the type-writer. In America stenography and the use of the mechanical writer go hand in hand: the letters are taken down in the one, and transcribed by the other: and as far as the present writer's experience goes, nearly half of the business communications sent to this country by high class American firms is type-written. The holder of the combined offices of 'stenographer' and 'machine operator' seems to enjoy quite a professional status and to command very fair remuneration; as indeed they ought to when their qualifications in the way of finger-deftness and thought-celerity are considered. The type-writer seems to be especially adapted for ladies' use, and we are very glad to see that in this country it has already initiated a well defined calling for educated women. The only drawback to the extended use of the Remington type-writer is its price, which, as it at present stands, is we fear almost prohibitive of its general adoption.

Mr. Harrison's little manual draws attention to an instrument whose capabilities cannot be too widely known.

Elementary Introduction to Chemical Theory.

H. Macan, M.A. (Oxon.), F.C.S. Manchester: John Heywood.

This is a small volume of 40 pages, containing short statements of facts and principles which have to be gone over and over until they become, in some way or other, part of the pupil's mental possessions. The book may be useful. It certainly might be more so. The statements are a little too dogmatic, too unqualified. Surely the atomic theory should have been mentioned, and its author. There is no difficulty in stating what that celebrated theory was invented for, and how it accomplishes the task. Why should a boy learn that 'an atom never remains in any substance without being joined to some other atom'? The boy is told that the relative weights of the molecules can be determined in virtue of Avogadro's law. He then reads that chemical analysis will tell the relative proportions of the elements in the molecule, so we find at once the relative weight of the elements of the weight of the atoms of the substances. Would this be clear to the boy's mind? Would it not be better he should learn a statement like this by heart? What the boy wants to know is how many atoms there are in the molecules whose relative weights are under consideration. Analysis gives the percentage composition by weight or by volume, and that is all. We have enlarged upon this, perhaps unduly, because of the tendency to give boys a sort of rough outline which can be corrected afterwards. We think this method is wrong. It is inevitable that there must be much to add; there ought to be nothing to unlearn.

The 'Practical' Mental Arithmetic.

By an Inspector of Schools. London: Longmans, Green and Co.

The 'Inspector of Schools' complains, and perhaps not without reason, that Mental Arithmetic seems to be the least successfully taught subject in Elementary Schools. The causes of this failure he attributes to 'want of system' and 'habitual neglect.' He then gives some general hints to teachers as to the aims and methods of lessons in this important part of education. The 'want of system' he has shown how to remedy by building up a very long and capital series of examples of questions based upon a definite plan, carrying it on through the whole of the standards.

The greatest need for quantity and variety as every practical teacher knows is in the lower standards, which often are left to the care of junior and inexperienced teachers. How these standards are cared for may be seen from the fact of there being upwards of a thousand questions for Standards I. and II. Every teacher would be amply repaid in the success of the school if he would purchase the book and go through the examples with his pupil teachers and junior assistants during the time appointed for lessons for the former. The little book thoroughly deserves the adjective 'Practical' included in the title.

Kinder und Hausmärchen gesammelt durch die Brüder Grimm.

With Notes and Vocabularies, by G. Eugène Fasnacht. London: Macmillan and Co.

In the title the author has omitted to mention the most valuable feature in the book—Imitative Exercises. For ourselves, we hope detached sentences will be banished from every school. Does any boy ever remember these 'disjecta membra' except with a shudder? Boys take great interest in imitating what they have read, and they must study the text carefully and thoroughly, otherwise they cannot do the imitative exercises. These exercises bring out (educate) every good linguistic quality the pupil possesses. The tales are very interesting, the notes very full and explanatory, and there is also a useful alphabetical vocabulary. We cordially recommend the book to all who wish to make rapid and solid progress in German.

The Mermaids: A Cantata for Female Voices.

By John Kinross. London: J. Curwen and Sons.

The cantata before us is a work of such exceptional merit that it demands more than a passing notice. Mr. Kinross has before received honourable mention in these pages in connection with the musical illustrations for Mrs. Curwen's admirable little work 'The Child Pianist;' we therefore turned to the present composition with pleasurable anticipations which have been, on the whole, fully realized. The cantata throughout shows the hand of the musician—scholarly, graceful, imaginative, refined. At places it is a little difficult, but the difficulties are of a kind that repay practice.

The accompaniments, too, are *real* accompaniments, not mere doublings of the voice parts; and they are added with much skill, judgment, and effect.

Altogether, 'The Mermaids' is decidedly one of the best cantatas for female voices we have ever seen.

Criticising the music from the high standpoint it naturally challenges, we observe a lack of 'breadth,' especially in the rhythm; with the exception of one short chorus and a recitative, the movements are all either in triple or compound measures—'linked sweetness long drawn out.'

We think, also, that the long intermezzo, No. 6, might be considerably shortened, with advantage to the work.

Oxford, Cambridge and College of Preceptors Examination Papers.

By Rev. Geo. Litting, M.A., LL.B., and George Home. London: Educational Supply Association, Ld., Holborn Viaduct.

One of the chief results of this age of competitive examinations is the preparation of examination tests and questions. Instead of education only being considered, all the teacher's aim is perforce to keep some examination in view and the end of his efforts is the success of his pupils in these tests. Mental disciplin counts for little in the efforts he puts forth. Until there is a radical change in our system we suppose this will continue to be the case, and if the end justifies the means then the preparation of these examination papers is thoroughly justified. The title of the volume before us sufficiently describes the nature of the work. It contains fourteen sets of progressive tests, increasing in extent and difficulty, in twelve different subjects, embracing all the essential and some of the special subjects of the three examinations named. The questions are practical and may be used as tests of general progress if necessary, without special reference to the particular object for which they were designed.

Seeley's Cheap School Books. Arithmetical Exercises.

By F. C. Horton, B.A. London: Seeley and Co.

This is a collection of one hundred short papers of miscellaneous examples in arithmetic. Each paper contains six questions, which have been selected from examinations of various grades from those given in elementary schools by Her Majesty's Inspectors to those given at the universities, and to candidates for the civil service, the army and the navy. There is some graduation in the exercises, as the earlier ones are confined to elementary rules, and additional difficulties are introduced at successive points in the book. The questions may be used with any text-book and will doubtless prove useful for testing the progress of pupils.

Junior Church Catechism.

By M. T. Yates. London and Manchester: John Heywood.

This pamphlet intended for young children contains a reprint of the Church Catechism without notes, a list of the difficult words with meanings, and a second reprint of the Catechism and notes to the same in parallel columns. The teaching in some of the notes is not in accordance with the belief of large numbers of members of the Church of England.

Handbell Ringing. By C. W. Fletcher. London: J. Curwen and Sons.

Mr. Fletcher, of the Royal Criterion Handbell Ringers, has produced an admirably clear and explicit work on the mysterious subject of which he treats.

The special notation required, the arrangements of the bells for particular keys, and the adaptation of the staff or sol-fa notations for hand-bell purposes are explained in a thoroughly practical and interesting manner, and the minutest details are dealt with, without unduly prolonging the volume.

We cordially recommend all our readers who feel interested in this popular and fascinating subject to procure a copy of Mr. Fletcher's book.

A few of the staff notation examples show traces of haste in the printing, as several blunders have escaped attention (particularly on pp. 41—43).

These do not, however, materially detract from the value of the book.

Sight-Singing and the Theory of Music. Revised and Enlarged Edition. London: National Society's Depository.

This useful and carefully prepared little work reappears with several improvements. It is arranged to meet the requirements of the New Code and the 'Moveable Do' system is adopted. It seems to us that it would have been much better to use the Sol-Fa syllables as arranged by Mr. Curwen: the names *do*, *rā*, *me*, *fa*, *so*, *la*, *te*, *do*^{1}, are in reality a compromise between the 'Fixed Do' and the Sol-Fa names. Thus, the second note of the scale, called by Sol-Faists 'ray,' and by Staff Notationists, generally, 're' (pronounced *ray*) appears in the present work as *rā*. To a Sol-Faist, *ra* is the 'flat of ray'; and as most teachers now get at least a smattering of Tonic Sol-Fa, the names adopted in the book before us would certainly be confusing and perhaps misleading.

A Merry Party. A Kindersingspiel. By A. L. Cowley. London: J. Curwen and Sons.

Mr. Cowley's long experience in connection with school music has been turned to practical account in this little work—a most interesting and effective cantata. Striking effects are constantly produced by the most simple means, and, both in matter and arrangement, the work stands far above the average school-cantata. The excellent round which forms No. 16 is a most happy effort, and testifies to the musicianly skill which Mr. Cowley has brought to bear on his work. Altogether, we consider 'A Merry Party' to be a very valuable contribution to the *repertoire* of school music.

The Musical Profession. By Henry Fisher, Mus. Doc. London: J. Curwen and Sons.

Dr. Fisher has given us a very interesting, instructive and readable book, treating most exhaustively on all the important questions relating to the Musical Profession. Preparation, Examination, Actual Work, Difficulties, Methods, Legal Matters, and a hundred other points of more or less importance come within the scope of the work, and Dr. Fisher has thrown light upon them all. We think there are only two things which will interfere with the success of the publication, its *bulk*, and its *price*. Could Dr. Fisher see his way to the issue of an Abridged Tabulated Edition, or Synopsis of his book, to be sold say at a shilling, he would confer a boon upon all young musicians who contemplate entering the profession.

The Armada: School Cantata. Compiled by A. J. Foxwell. London: J. Curwen and Sons.

Though not wanting in effectiveness and interest we cannot give unqualified praise to this compilation. With some few exceptions the music is decidedly commonplace, and such words as those of No. 4, 'What a bother 'tis with women, &c.,' are hardly appropriate or becoming on the lips of young children.

The Fairy Grotto. By E. W. Stratton. London: J. Curwen and Sons.

This Operetta is so bright and tuneful, and the general effect of it so pleasing, that it seems to us a pity that the harmonies are not more correctly written. In fact the whole composition is so good that it is quite evident that Mr. Stratton could make it much better if he wrote more carefully. There is a general looseness and exaggerated freedom in the progression of the parts which will prevent the acceptance of the work among musicians, who would otherwise admire the unmistakeable ability of the composer.

The Eton Latin Grammar, for use in the higher forms. By F. H. Rawlins, M.A., and W. R. Inge, M.A.

The Eton Horace: Part I. Odes and Epodes (Text and Notes). By F. W. Cornish, M.A. London: John Murray.

Whatever adverse criticism may be made upon these two books will certainly not extend to the form in which they have been published, which is in every respect admirable. Nor is this praise by any means entirely to be appropriated by the publisher. In both instances, and, from the nature of the case, especially in the Grammar, the task of the student has been lightened in every possible way by the judicious variations of type, each applied, so to say, with a definite pictorial purpose, so as to make the eye help the understanding of the learner to the farthest possible limit. Take an instance at random from page 147 of the Grammar, on which the formation of the present stem in the 3rd conjugation is discussed. One of the examples given is *nanciscor:* the word is printed na-**n**-c-*i*-scor. The letter **n** is in leaded type, showing that in it the reader is to look for the example of the rule in question, the nasalisation of the verb stem nac; whilst the italicised *i* reminds him that it does not belong to the stem, but is merely a link-vowel between the stem and the suffix -sc. Helps like this in a school-book are of a value and importance which will be appreciated by all teachers. The philological part of the accidence is, we are glad to see, very thoroughly done and clearly arranged; the fourth chapter, on the laws of sound-change, is a good case in point. The chapter occupies less than seven pages; it would be interesting to know how many boys go up from school with classical scholarships to Oxford or Cambridge owning any clear knowledge of the rules contained therein, which lie at the very foundation of the philological structure of the Latin language.

Any exposition of the syntactical construction of a language is always more open to difference of opinion than the accidence. Where, for instance, two uses of a case, such as the instrumental and modal ablatives, closely approach each other, it is hardly possible to draw a distinction which will satisfy everybody. Nor does the Eton Grammar settle the question; it would be hard for the teacher to decline to accept the explanation of *injuria suspectum* as an ablative of manner, and insist on classifying it as an ablative of attendant circumstances, minus the usual qualifying adjective or genitive. Mr. Roby's rule seems better, that the ablative of manner is ordinarily so qualified, except where it approaches most closely to the instrumental ablative, and in certain old phrases. So too the rules for the use of the third personal reflexive pronoun are hardly satisfactory. If the learner is taught that 'in a dependent clause, when the Subject is not the same as the Subject of the sentence, *se* and *suus* refer regularly to the Subject of the sentence, and not to that of the dependent clause,' is he not bound to believe that such a sentence as *Cæsar militibus imperat, ut se reciperent*, is false Latin?

The Eton Horace labours under the disadvantage of being written for boys who ought not to be reading Horace at all. If a boy is so young, or so backward, as to need notes like that on Ode xxxi., 17, in the first book, in which the words are re-arranged in the *English* order, as well as interspersed with explanation and translation, is it likely that, unable by himself to make out the sense of a single sentence, he will at all realise or appreciate the connection of thought or the general drift of the whole Ode? The notes do not lay much claim to originality, being taken, as the prefatory note states, principally from Orelli. If their object is simply to enable the average boy of the middle and lower forms of a public school to produce a fairly correct translation of his lesson, they may be said to satisfy the requirements; it can hardly be hoped that the analysis of the matter which precedes the notes on each Ode will accomplish the hopeless task of instilling into such a boy any sense of the delicate allusiveness, the subtle transitions of thought, the graces of expression in which lies the whole charm of Horace's Odes, and of lyric poetry generally.

Geographical Reader: No 6, Holborn Series.

London: Educational Supply Association, Lim.

This is a thoroughly interesting reader, neither too difficult in the phraseology nor too full of useless names. A successful attempt has been made to make the chapters word-pictures of the countries and the peoples of which they treat. The notes, maps, and facts in the appendix are all that could be desired, while the type, paper, binding, and illustrations are among the best of their kind.

The Training College Music Course.

By Edward Mills, Mus. Bach., Oxon. London: J. Curwen and Sons.

The Music Teacher in three Metropolitan Training Colleges, Mr. Mills has had ample opportunity of discovering the needs and capabilities of students in training. The book before us is a Staff Notation course, Vocal and Theoretical, and contains a large number of well graduated exercises in addition to examination papers and questions.

The Leipzig Album.

A Collection of two-part songs for use in Colleges and Schools. Parts I. and II. London: J. Curwen and Sons.

A most admirable collection of two-part songs. The music is of a high class and not too difficult, and the Staff Notation copies before us are handsomely got up and printed in clear and bold type. A cheap Sol-Fa edition is also published. We hope Messrs. Curwen will be able to continue this most excellent series.

The Shepherd's Garden; a Cantata for equal voices.

Life at Sea; an Operetta for Boys' Schools and Academies.

By T. M. Pattison. London: J. Curwen and Sons.

Both these little works are in Mr. Pattison's tuneful and melodious style, being effective without demanding too much from the performers. They can be confidently recommended for school use.

The Musical Inspection: how to prepare for it.

By a School Music Instructor. London: J. Curwen and Sons.

This is a very useful and well written hand-book and should be in the Library of every school teacher. Though specially compiled for use in connection with the Sol-Fa Notation, the hints on the art and methods of teaching will be found valuable and interesting to those who prefer the Staff.

The Scholar's Geography.

By J. S. Horn. London and Manchester: John Heywood.

This book is intended for elementary schools. It contains the facts common to books of this class, arranged in sections of a suitable length for memory work. It is strongly bound and well printed.

Times.—'Perfect.'

Standard.—'Very complete.'

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> *Wisdom is humble that he knows no more.'*—COWPER.

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Pestalozzi.

BY THE REV. CANON WARBURTON, M.A.,

Formerly Her Majesty's Inspector of Training Colleges for Schoolmistresses.

CHAPTER V.—*continued.*

Lessons in Language, Form, and Number.

Of his lessons in Language we have already learned something in former pages, but it is only fair to state the *theory on which he intended* language should be taught, though we may not be disposed to imitate his practice in all its details. The first step, he tells us, is to teach the child to distinguish articulate sounds and imitate them. The second is to teach him to name everything brought under his notice, in order to furnish him with a supply of words. The third is to teach him to distinguish and name the most striking parts, characteristics, and qualities of particular objects—to observe them with intelligence, and then express himself correctly in describing them. The fourth is to teach him to abstract, generalise, and classify in language. The fifth, and last, is to teach him to describe not only the qualities of objects, but their uses, combinations and relative values; and to assign them their several places in the social economy of the world. In this way the habit of viewing the material world with intelligence is excited and cultivated, and this is combined with the power of correct and ready expression. 'Language,' Pestalozzi observes, 'is the reflex of all the impressions which Nature's entire domain has made on the human race. Therefore I make use of it, and endeavour, by the guidance of its uttered sounds, to reproduce in the child the selfsame impressions which, in the human race, have occasioned and formed these sounds. Great is the gift of language! It gives to the child in one moment what Nature required thousands of years to give to man.' Compare these observations with the statement of Pestalozzi's opinions in p. 282, and mark how, in dealing with the relations of words and things, this profound but irresolute thinker fluctuated between the two great schools of thought which have divided the world since the days of Plato and Aristotle.

Secondly, with respect to Form. Pestalozzi invented a few of those simple mechanical appliances by which the eye and touch of babies are taught to distinguish between round and square, a process which we find thus magniloquently described: 'He learns the data of the science from the examination of geometrical solids.' Under the head of form he included writing, drawing, and geometry, holding that the basis of each of these requirements was the perception of shape and dimension. Drawing ought to be an universal accomplishment, because it leads the child from vague perceptions to clear ideas. The art of measuring must, however, precede that of drawing. 'If a child,' says he, 'is called upon to imitate objects before he has acquired a distinct notion of their proportions, his instructions in the art of drawing will fail to produce on his mental development the beneficial influence which alone makes it worth learning.' Then, again, writing, he contended, should be taught, not before, but after drawing, 'for writing is, in fact, a kind of linear drawing, and that of fixed forms, from which no arbitrary or fanciful deviations are permissible.' *

As to the method of imparting the last of the three Pestalozzian 'elements,' namely, Number, he thus writes himself: 'The rudiments of number should always be taught by submitting to the eye of the child certain objects representing the units. A child can conceive the idea of "two balls," "two roses," "two books," but it cannot conceive the idea of "two" in the abstract.' To this Dr. Mayo adds: 'When the child has been thus exercised in distinguishing and naming "one," "two," "three," the number of the different objects presented, he will soon have an intuitive perception that the terms "one," "two," "three" are always the same, while the objects, to which they are applied, vary; he will thus be prepared to separate the idea of number from that of the thing, and so ascend to the abstract idea. When he has a correct idea of the numbers up to ten, he is ready to carry on different combinations of these numbers. By practical examples, he learns to form rules for himself—he works his own way, acquiring power, vigour, and readiness at each advance; he is not led hoodwinked through the intricacies of arithmetic, but understands what he is about, first becoming acquainted with elements, and then enjoying the pleasure of finding the results of their various combinations. The whole is a *reasonable* exercise.'

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* The principles of Pestalozzi's system of Geometrical instruction have been successfully and beautifully applied in 'The Lessons on Form' of Mr. Reiner, late of the Home and Colonial Training College.

To conclude with a few words on the Pestalozzian method of teaching the elements of Latin, for which this seems to be the proper place. Dr. Mayo thus writes in one of the letters from which extracts have already been given: 'Pestalozzi does not begin with definitions, because children never comprehend them; but first, calling up the idea in the child's mind by conversing with him, he gives him the simple sentence "*leo est animal.*" Here the words *leo* and *animal*, being, one almost the same, the other quite the same as those which express the same ideas in English, they readily enter the child's mind. From this he proceeds to "*an ape is—what?*" "*an animal.*" "*Simia est—what?*," "*animal*," the child using the word he had learned just before. Proceeding in this manner he stocks the child's mind with words, before he enters on the inflexions of those words, always endeavouring to link what the child has to learn with what he has already acquired. In the declensions he does not propose to the child "*musa*, a Muse, *musæ*, of a Muse"—words which cannot interest the child, because they represent only parts of ideas—but he involves the important word in sentences, thus: "*rosa est flos amœnissimus horti*," "*rosæ odor est suavis*," &c., through all the cases. The child having learned the inflexion of *rosa*, has a similar word proposed to him, also enveloped in little sentences, but he is now required to find the terminations. The advantages of this method are briefly these: you do not disgust the child with his first intellectual exertions, you exercise other faculties besides memory, you enrich his mind with a great number of ideas, and you furnish him with a *copia verborum* before you set him down to translate a classical author, or to express his own ideas in a connected chain in the language.' The same writer thus contrasts the above with the ordinary method of teaching language: 'In spite of every indication that the youthful mind spontaneously gives that it is led from the perception of particulars to the conception of universal propositions—that it must first see embodied in realities and clothed with circumstances, the ideas which it is afterwards to recognise in their pure, abstract, intellectual form—the prevailing practice is forcibly to drive a child of tender years through the generalities of grammar, unintelligible and uninteresting to him; till at last, in the course of their practical application, the true order of thought is established in his mind, and he understands and appreciates his grammar, through the knowledge which he derives from studying the language itself.'

The ideas thus enunciated were developed with well-known success in Dr. Mayo's own Pestalozzian school at Cheam. They lie at the bottom of the 'Hamiltonian' method, and of the 'Mastery System' of Mr. Prendergast, which is daily commending itself more and more to the minds of educationalists, as the true, rational, and scientific method; and, backed by his able and persevering advocacy, bids fair to revolutionise in the coming generation, the whole English system of teaching languages living and dead.

CHAPTER VI.

The Principles of Pestalozzi.

'A man should know something about everything, and everything about something.' It was a very shallow retort on the part of a distinguished architect, to whom complaint was made that a building which he had erected was crumbling to pieces from defective materials: 'I am an architect, and not a brick-burner.' A consummate artist is bound to be acquainted with the minutest details involved in his art, and an architect should have learned, not only how to burn bricks but to lay them; should be well acquainted with the relative strength and durability of materials, and so ascend through statical certainties and mechanical calculations to these grand imaginative conceptions by which monumental structures are raised, and domes 'hung high in air,' defying the assaults of time. Those who have taken the trouble to follow the history of Pestalozzi thus far will have seen that he possessed in a remarkable, perhaps in an unequalled degree, the gifts by which children's hearts and sympathies are won. He was never so much at home as when surrounded by a circle of little folks, with a child upon his knee, absorbed in the delightful task of making the acquisition of knowledge delightful. It is in this aspect of his character that 'Father Pestalozzi' is best known and best remembered by his own pupils, and those who have learned from them to love him. But it must not be forgotten that along with all the simplicity and gentle enthusiasm of a village dominie of the old school, Pestalozzi was gifted with a profound and original insight into what may be called the 'metaphysics' of education, and that he speaks when he addresses the world at large, with all the authority of a great thinker, and a full confidence in the inspiration of genius.

(*To be continued.*)

Quarterly Arithmetical Tests.

STANDARD I.—FIRST QUARTER.

1. $\begin{array}{r} 140 \\ 36 \\ 7 \\ 501 \\ \underline{98} \end{array}$

2. $\begin{array}{r} 746 \\ \underline{341} \end{array}$

3. $\begin{array}{r} 859 \\ \underline{217} \end{array}$

4. 2 × 12; 9 × 3; 4 × 7.

SECOND QUARTER.

1. $\begin{array}{r} 65 \\ 729 \\ 4 \\ 80 \\ \underline{903} \end{array}$

2. $\begin{array}{r} 561 \\ \underline{458} \end{array}$

3. $\begin{array}{r} 304 \\ \underline{30} \end{array}$

4. 5 × 3; 4 × 4; 11 × 6.

THIRD QUARTER.

1. $\begin{array}{r} 417 \\ 608 \\ 390 \\ 561 \\ \underline{872} \end{array}$

2. $\begin{array}{r} 125 \\ \underline{69} \end{array}$

3. $\begin{array}{r} 903 \\ \underline{895} \end{array}$

4. 12 × 4; 5 × 9; 8 × 6.

Standard II.—First Quarter.

1. 459 + 70 + 8,065 + 912 + 3,608 + 57,381.
2. From 40,001 take 29,063. Write the answer in words.
3. 80,927 × 59.
4. 32d.; 43d.; 69d.

Second Quarter.

1. 58,073 × 720.
2. 27,156 ÷ 4.
3. What number added to forty-nine thousand seven hundred and six will make one hundred thousand?
4. 83d.; 97d.; 104d.

Third Quarter.

1. 71,386 ÷ 12.
2. 84,957 × 8,006.
3. A man had 250 apples. He sold nine each to eighteen boys. How many had he left?
4. 112d.; 138d.; 142d.

Standard III.—First Quarter.

1. 22,678 ÷ 23.
2. Divide the product of 595 and 456 by 408.
3. How often is five hundred and seventy contained in four hundred and fifty thousand three hundred?
4. In building a house there were used 18,346 red bricks and 2,098 white bricks. How many cartloads were there, reckoning 269 in a load?

Second Quarter.

1. Find the sum of £503 16s. 5½d., £81 10s. 11¼d., £6 15s. 7d., £4 19s. 8¾d., £29 4s. 10½d., and £370 18s. 9¼d.
2. From £805 16s. 4¾d. take £795 17s. 9½d.
3. A boy had a bag of marbles out of which he gave 27 boys 8 each. He then had 84 left. How many had he at first?
4. After spending 4s. 7½d., giving away 2s. 9d., and losing 5½d., how much had I left out of half-a-sovereign?

Third Quarter.

1. Take £8,475 18s. 10½d. from £30,002 6s. 3¼d.
2. What number must be multiplied by 76 to get the same answer as 1,615 multiplied by 348?
3. Eleven pounds eighteen shillings and seven pence farthing + six hundred and five pounds fourteen shillings and nine pence halfpenny + six thousand seven hundred and ninety pounds nineteen shillings and six pence farthing + seven thousand and eighty-six pounds fourteen shillings and eleven pence three farthings + fifty thousand two hundred and nine pounds seventeen shillings and fourpence halfpenny + six hundred and eighteen pounds twelve shillings and ten pence three farthings.
4. A and B have together twenty thousand pounds. If A has £8,706 14s. 9½d., how much has one more than the other?

Standard IV.—First Quarter.

1. £60 13s. 8¼d. × 605.
2. Divide seven hundred pounds and three half-crowns by nineteen.
3. What must be paid for 40 dozen bottles of wine at 4s. 8d. per bottle?
4. £105,709 15s. 11¾d. ÷ 178.

Second Quarter.

1. A man buys 540 marbles at 3 dozen for 2d., and sells them at 10 a penny. What does he gain?
2. How many ounces are there in 2¾ tons?
3. How many tiles 9 inches long will make a border 17 poles in length?
4. A farmer bought 18 sheep for £46 10s. 3d., and sold them for £50. How much did he gain on each sheep?

Third Quarter.

1. Reduce 5 ac. 2,795 sq. yds. to sq. inches.
2. How many stones, &c., are there in one hundred and ninety thousand and seventeen drams?
3. How many seconds are there in the last three months of the year?
4. A man drinks a pint of beer daily, the cost of which is 2½d. How much will he spend in beer in 3 years, one of them being a leap year?

Standard V.—First Quarter.

1. A man owes £670, but can only pay 7s. 9d. in the pound. How much do the creditors lose?
2. What is the cost of 2,417 articles at £7 7s. 7¼d. each?
3. Find the value of 247 qrs. 6 tns. 1 pk. at 34s. 8d. per quarter.
4. What will 17 trucks of coals, each 2 tons 19 cwt. 1 qr., cost at 11s. 8d. per ton?

Second Quarter.

1. If a man pay £37 16s. income tax, at the rate of 7d. in the £, what is his income?
2. Make out a bill for:—

3 stones of flour at 1½d. per lb.;
7 doz. lemons at 8 for a shilling;
4¾ lbs. of sugar at 3d. per lb.;
7 ounces of tea at 3s. 4d. per lb.;
5 doz. oranges at 3 for 2d.

3. If 17 cwt. 3 qrs. 7 lbs. are carried 100 miles for 16s. 9d., how far should 4 tons 13 cwt. 3 qrs. be carried for the same money?
4. Bill:

90 nail-brushes at 5s. 6d. per doz.;
2 doz. hat-brushes at 1s. 2½d. each;
3½ doz. clothes-brushes at 2s. 9d. each;
123 tooth-brushes at 4s. 6d. per doz.

Third Quarter.

1. What must be taken from $\frac{2}{3} + \frac{3}{4}$ to leave $\frac{8}{9}$?
2. A train uses 17 cwt. 36 lbs. of coal a day; what will it use in 23 days?
3. Write $\frac{1323}{2079}$ in a simpler form.
4. From $(\frac{1}{3} + \frac{3}{8} + \frac{1}{6})$ take $(\frac{1}{2} + \frac{1}{9})$.

STANDARD VI.—FIRST QUARTER.

1. What must $2\frac{1}{9}$ be multiplied by to give $7\frac{3}{5}$?

2. $(5·006 \times 3\frac{1}{2}) - (1·05 \div ·064)$.

3. Find the total length of four pieces of cloth, measuring $17\frac{3}{8}$ yards, $25\frac{2}{3}$ yards, $36\frac{7}{10}$ yards, and $49\frac{3}{5}$ yards respectively.

4. Simplify:—

$$\frac{·\dot{3}\dot{5} - ·\dot{2}}{·0\dot{3}\dot{9}}.$$

SECOND QUARTER.

1. What decimal of £$7\frac{1}{2}$ is $\frac{5}{6}$ of $\frac{3}{4}$ of a crown?

2. If $\frac{7}{9}$ of a ship cost £11,732, what is the value of $\frac{3}{10}$ of the ship?

3. Find the value of ·9 of £2·75 ÷ $·\dot{4}$ of 8·25.

4. After spending $\frac{2}{7}$ of my money I find I have left one five pound note, three half-sovereigns, two half-crowns, and ten pennies. How much had I at first?

THIRD QUARTER.

1. A travels on a tricycle and goes 48 miles a day. B starts 7 days after on a bicycle, and travels 76 miles a day. How long will it take B to catch A?

2. Find the amount of £298 15s. for $6\frac{1}{2}$ years at $3\frac{1}{2}$ per cent.

3. If a clerk have a salary of £96 5s. a year, commencing 1st March, how much should he receive on leaving his employment on the evening of 5th of October?

4. What principal will obtain £49 19s. interest in 3 years at $2\frac{1}{4}$ per cent.?

STANDARD VII.—FIRST QUARTER.

1. If 18 men earn £25 for 4 days' work, how much will 26 men earn in 27 days?

2. What sum will amount to £769 8s. 9d. in $5\frac{1}{4}$ years at $3\frac{1}{2}$ per cent.?

3. If ·625 of a ton be carried 7 miles for £2 6s. 8d., what weight ought to be carried 3 miles for 4s.?

4. If in a school ·68 of the children are boys, and there are 54 more boys than girls, how many children are in the school?

SECOND QUARTER.

1. Find the average of 17 cwt. 22 lbs., 5 tons 11 cwt. 49 lbs., and 19 stone.

2. In what time will £850 amount to £969 10s. $7\frac{1}{2}$d. at $3\frac{3}{4}$ per cent.?

3. A man sold 198 pairs of boots for £133 13s. at a profit of 1s. 9d. per pair. What was the average cost per pair?

4. A leap year began on a Monday. What decimal of the year would the Mondays be? (Answer to five places of decimals.)

THIRD QUARTER.

1. A piano was sold for £41 12s. 6d. at a loss of $7\frac{1}{2}$ per cent. What was the cost price?

2. Find the average of 4·59, 67, ·025, 3·14, 19·008, and ·6.

3. A farmer had 560 animals; $71\frac{3}{7}$ per cent. were sheep, 15 per cent. were cows, and the rest were horses. Find the number of each kind.

4. The number at an examination was 259, of which 234 were successful. What per centage failed? (Answer to three decimal places.)

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	782.	1,781.	2,848.
2.	405.	103.	56.
3.	642.	274.	8.
4.	24; 27; 28.	15; 16; 66.	48; 45; 48.

STANDARD II.

	FIRST.	SECOND.
1.	70,495.	41,812,560.
2.	10,938.	6,789.
3.	4,774,693.	50,294.
4.	2s. 8d.; 3s. 7d.; 5s. 9d.	6s. 11d.; 8s. 1d.; 8s. 8d.

THIRD.

1.	5,948 + 10.	3.	88 apples.
2.	680,165,742.	4.	9s. 4d.; 11s. 6d.; 11s. 10d.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	986.	£997 6s. $4\frac{1}{4}$d.	£21,526 7s. $4\frac{3}{4}$d.
2.	665.	£9 18s. $7\frac{1}{4}$d.	7,395.
3.	790 times.	300 marbles.	£65,323 18s. 2d.
4.	76 cartloads.	2s. 2d.	£2,586 10s. 5d.

STANDARD IV.

	FIRST.	SECOND.
1.	£36,714 0s. $11\frac{1}{4}$d.	2s.
2.	£36 17s. $2\frac{3}{4}$d. + 7 q.	98,560 oz.
3.	£112.	374 tiles.
4.	£593 17s. 6d. + 47 q.	3s. $10\frac{1}{2}$d.

THIRD.

1.	34,985,520 sq. in.	3.	7,948,800 sec.
2.	53 st. 4 oz. 1 dr.	4.	£11 8s. 4d.

STANDARD V.—FIRST.

1.	£410 7s. 6d.	3.	£429 9s. 9d.
2.	£17,837 19s. $3\frac{1}{4}$d.	4.	£29 7s. $6\frac{3}{4}$d.

SECOND.

1. £1,296.
2. 5s. 3d. + 10s. 6d. + 1s. $2\frac{1}{4}$d. + 1s. $5\frac{1}{2}$d. + 3s. 4d. = £1 1s. $8\frac{3}{4}$d.
3. 19 miles.
4. £2 1s. 3d. + £1 9s. + £5 15s. 6d. + £2 6s. $1\frac{1}{2}$d. = £11 11s. $10\frac{1}{2}$d.

THIRD.

1.	$\frac{19}{38}$.	3.	$\frac{7}{11}$.
2.	19 tons 18 cwt. 44 lbs.	4.	$\frac{19}{72}$.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	$3\frac{3}{5}$.	$·0208\dot{3}$.	12 days.
2.	1·11475.	£4,525 4s.	£366 14s. $3\frac{3}{4}$d.
3.	$129\frac{41}{120}$ yds.	13s. 6d.	£57 15s.
4.	$3·\dot{3}$.	£9 10s. 2d.	£740.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	£243 15s.	2 tns. 3 cwt. 75 lbs.	£45.
2.	£650.	$3\frac{3}{4}$ years.	$15·7271\dot{6}$.
3.	·125 ton or $2\frac{1}{2}$ cwt.	11s. 9d.	400 sheep, 84 cows, and 76 horses.
4.	150 children.	·14480...	9·652...%

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Our Certificate Class.

BY DR. GEORGE BEACH, M.A.

Head Master of Christ Church School, Macclesfield.

EUCLID.

In our view there is no other branch of Mathematics comparable with Euclid as regards practical utility and educational value. Without its results, Astronomy, Optics, Mechanics, Navigation and a host of kindred sciences could not exist except in rudimentary forms. Perhaps it is not too much to assert, that there is NO physical science but is deeply indebted to Euclid, whilst to the ordinary artisan it is also extremely helpful. Its educational value, disciplinary and logical, is immense in correcting any tendency towards fallacious and diffuse reasoning, or illogical assumptions. Like an old Roman road lasting throughout generations, it traverses the mathematical area, and is still the great highway to geometrical results.

Its only danger is the one common to mathematical research in general, and to which incredulous minds are peculiarly susceptible, that of refusing credit to all things (and there are many such) that cannot be weighed, measured, calculated, or demonstrated with absolute and precise certainty. Literary study, especially of poetry, is, however, an efficient rectifier of this narrowing tendency, and is in fact its natural antidote.

As regards the Certificate Exam. the questions propounded before 1882 are not of much technical assistance to us, but on the other hand, the queries of the last six years are materially helpful; and on these latter we therefore base our observations.

Only eight questions are allowed to be answered, and at least a dozen will be given from which the selection may be made. The first eleven will probably be duplex, consisting both of a proposition and a deduction, whilst the twelfth will be a deduction alone, but presenting more than average difficulty. In answering, 'Capital letters (excluding A, B, C, D, E, F), not numbers, must be used in the diagrams. The only signs allowed are + and =. The square on PQ may be written "sq. on PQ," and the rectangle contained by PQ and RS, "rect. PQ, RS." Other abbreviations, if employed, must not be ambiguous.'

First will doubtless come (as is the invariable practice) two questions on Book I., followed by one question on Book II., four on Book III., two on Book VI., and lastly the aforesaid difficult deduction.

The examiners appear to have no favourite questions in Book I., but throughout the remaining books the inquisitorial mind is fairly manifest. In Book II., Propositions 3, 4, 12, 15; in Book III., Propositions 3 (set four times), 15, 17, 18 (set three times), 22 (four times), 32, 35, 36; in Book IV., 4, 5, 6, 10 (four times); in Book VI., 2 (four times), 8, 13 are evidently in the highest esteem.

The Propositions should be frequently revised by the pupil. This even with our limited time is quite practicable as from forty to sixty minutes is quite sufficient to re-peruse even Book I. or III. The practice of merely committing to memory is as useless as it is foolish.

Not only should Euclid's results be thoroughly understood, but an intelligent idea of the logical methods employed (such as 'Superposition,' 'Reductio ad Absurdum,' 'Reductio ad exhaustum') should be conceived. All the divers converses of theorems, all the terms employed, all the restrictions introduced, should be capable of enunciation and explanation by the student.

The Deductions (and we use the term generically to comprise 'Riders,' 'Exercises,' 'Cuts,' etc.) are generally based upon the annexed propositions. Those upon Book III., and those from Book I. applied to exercises upon other 'Books,' are most in vogue. 'Candidates are reminded that correct solutions of the Deductions obtain high marks.'

They are thus of higher value than the Propositions, and rightly so, for they are practically innumerable and cannot be mechanically crammed up like the limited number of the Propositions.

Even books of Deductions should only be used like Arithmetical 'Keys.' They are exceedingly useful as walking-sticks, but utterly useless as crutches.

The examinee must become skilled in Geometrical Analysis (specimens of which are given in every good edition of Euclid) and especially should be able to construct triangles, as these are really the foundation of all constructions.

If when our students are endeavouring to solve Deductions, they are able to propound original ones which their investigations have suggested, the unction of confidence may be fairly applied, but the mind which cannot originate Deductions cannot retain communicated ones.

The following 'Key' Deductions are of essential importance, and are useful (speaking generally) throughout all the 'six books.'

'The line joining the middle points of the sides of a triangle is parallel to the base.'

'The middle point of the hypotenuse of a right angled triangle is equidistant from the three angles.'

'The perpendicular from a given point upon a given straight line is the shortest line that can be drawn from the point to the line.'

'The diagonals of parallelograms bisect each other.'

'Equal triangles upon equal bases are between equidistant parallels.'

'The sum of the squares on the sides of any triangle is double of the sum of the squares on half the base, and the line joining the vertex to the middle point of the base.'

'The common chord of two intersecting circles bisects the common tangent.'

Considerations of symmetry frequently assist the solver, *e.g.*, 'in inscribing an equilateral triangle in a square.' Here it is evident that the sides of the triangle must meet in the extremity of, and be equally inclined to the diagonal of, the square.

By considering extreme 'cases' we can often arrive at a general solution, as in 'if from any point without a circle, lines be drawn cutting the circle, and making equal angles with the longest line, they will cut off equal segments.'

By imagining the extreme case, where the given point is in the circumference, the demonstration is at once suggested.

A general solution can often be built up from the simple cases, see Euclid III., 35.

As Book III. is so much utilised, it would be well for the student to take the elements of ordinary problems (such as points, lines, angles, circles, touching, cutting, intercepting) and combine them (generally in threes) into every possible variety.

A very difficult and instructive exercise is to prove that certain problems are impossible.

Maxima, Minima, Constants and Loci, should not be neglected. Proposition III., 15, is an example of Maxima, and Propositions III., 7 and 8 of both Maxima and Minima. As an instance of 'Constants,' 'The sum of the opposite angles of any quadrilateral figure described in a circle is invariable,' may be adduced. As a specimen of 'Loci' take the following: 'The loci of the vertices of all equal triangles upon the same base are lines parallel to this base.'

ALGEBRA.

Eleven questions may probably be answered in Algebra and Mensuration, nine in the former subject and two in the latter, and very little latitude of choice is allowed; in fact the paper is (speaking relatively) a distinctly difficult one, demanding a thorough knowledge of the subjects.

None of the points enumerated in the Second Year Syllabus ever remain untested; the First Year Course is likewise again brought under review, and the general algebraic proficiency of the candidate is examined into. In connection with the amount of knowledge required it is instructive to notice the words 'at least' in the foot-note which expands this part of the Syllabus. Scales of Notation although not expressly mentioned are sometimes asked for under cover of this phrase.

As is natural in a fairly advanced paper, not only are problems and mechanical questions propounded, but the proofs of various formulae and theorems, and the explanation of divers processes are demanded.

'Solutions must be given at such a length as to be intelligible to the Examiner, otherwise the answer will be considered of no value.'

In Mensuration the relative value of cubes, spheres, cylinders, and cones of the same altitude, with problems respecting rings, hollow bodies, and frustra of cones, are favourites; $3\frac{1}{7}$ is always assumed as the value of π, and answers need not be carried farther than two decimal places.

Male candidates who have not been previously examined, or have failed, or who have not passed satisfactorily in Arithmetic, must take Arithmetic instead of Mensuration.

Factors.—The importance of facility in factorising cannot be too much insisted on. The most advanced student can always find something to learn about factors. Knight's Algebraic Factors, published by Blackie, is a very helpful little work.

Besides the directions usually given, attention is solicited for the following three methods.

A. When the coefficients of an expression can be disintegrated into groups, so that each group has its coefficients in the same ratio, the expression may be factorised. This process is really separating the product into the various expressions (lines of a multiplication sum) of which it is the total.

Example. $6x^5 - 4x^4y - 11x^3y^2 - 3x^2y^3 - 3xy^4 - y^5 =$

$$6x^5 - 12x^4y + 3x^3y^2 - 3x^2y^3 + 8x^4y - 16x^3y^2 + 4x^2y^3 - 4xy^4 + 2x^3y^2 - 4x^2y^3 + xy^4 - y^5 =$$

$$3x^2(2x^3 - 4x^2y + xy^2 - y^3) + 4xy(2x^3 - 4x^2y + xy^2 - y^3) + y^2(2x^3 - 4x^2y + xy^2 - y^3) =$$

$$(3x^2 + 4xy + y^2)(2x^3 - 4x^2y + xy^2 - y^3).$$

B. When the algebraic sum of the coefficients of a sum is zero, $x - 1$ is a factor.

Example.

$$x^4 - 7x^3 + 4x^2 - 5x + 7 = (x - 1)(x^3 - 6x^2 - 2x - 7).$$

C. To factorise $12x^2 + 22xy + 8y^2$. $12 \times 8 = 96$. Now find two numbers whose sum is 22 and product 96. These are 16 and 6. Then proceed as in 'A.'

$$12x^2 + 22xy + 8y^2 = 12x^2 + 16xy + 6xy + 8y^2 = 4x(3x + 4)y + 2y(3x + 4y)$$

$$= (4x + 2y)(3x + 4y).$$

Miscellaneous Notes.—Be prepared to solve Quadratics by factorising, after having arranged the equations in the form $3x^2 - 5x - 28 = 0$, $3x^2 - 12x + 7x - 28 = 0$, $3x(x - 4) + 7(x - 4) = 0$, $(3x + 7)(x - 4) = 0$, $(3x + 7) = 0$, and $(x - 4) = 0$, etc.

A good instance of this principle is found in the 5th Question of the 1884 paper. 'Find the common root of these equations.'

$$x^3 - 9x^2 - 16x + 144 = 0,\ (x + 4)(x - 4)(x - 9) = 0$$

$$x^3 + 7x^2 - 20x - 96 = 0,\ (x + 3)(x - 4)(x + 8) = 0$$

Prove the theorems.

'When $n + 1$ figures of a square root have been obtained by the ordinary method, n more may be obtained by ordinary division only, if the root contain but $2n + 1$ figures.'

'When $n + 2$ figures of a cube root have been obtained by the ordinary method, n more may be obtained by ordinary division only, if the root contain but $2n + 2$ figures.'

The twenty exercises on the Progressions, in Todhunter's larger Algebra, should be worked, as invariably they appear more or less disguised in the Examination Paper.

The number of combinations of n things taken r at a time is always asked for, and frequently the number of permutations of n things (which are not all different) taken altogether.

Investigate the method for extracting the square root of a binomial surd, one of whose terms is a quadratic surd, and the other rational.

Be able to prove that Log n to the base b may be found by multiplying $\text{Log}_a n$ by $\text{Log}_b a$ or by $\frac{1}{\text{Log}_a b}$.

The process of obtaining the co-efficients of any expansion of $(x + y)^n$ may be thus popularised. Take for instance $(x + y)^7$. Here the 1st C. is 1, the 2nd C. is $\frac{7}{1}$ of the 1st C., the 3rd C. is $\frac{6}{2}$ of the 2nd C., the 4th C. is $\frac{5}{3}$ of the 3rd C., etc.

'In the expansion of $(x + y)^n$, the C. of the rth term from the beginning is equal to the C. of the rth term from the end.' For the rth term from the beginning may be made the rth term from the end, by writing $(y + x)^n$ instead of $(x + y)^n$.

Both in the combinations, permutations and the binomial theorem many common sense and yet scientific methods of proof (as the above instance) will suggest themselves, which are quite as good as the more ordinary, ponderous and formal proofs. Instances of 'Mathematical Induction' should be mastered.

ARITHMETIC.

FOR FEMALES.

For the last eight years ten questions is the maximum number allowed to be answered, and these selected from fourteen or fifteen. The ample time of two and a half hours, or fifteen minutes per sum is granted. 'The solutions must be given at such length, as to be intelligible to the Examiner, otherwise the answers will be considered of no value.' One question at least is every year set upon Discount, Stocks, Compound Interest, Square Root, Insurance, Percentages, Vulgar or Decimal Fractions, and problems involving either G.C.M. or L.C.M., and very frequently, though not annually, upon Ratios, Proportionate Shares, Partnerships, Clock sums (gaining or losing time, position of fingers), Averages, 'Mixtures,' Compound Proportion, the properties of the figure '9,' the peculiarities of the Calendar, and the Theory of Vulgar and Decimal Fractions.

Queries have also appeared respecting the theory of nearly all the rules required, and definitions or explanations of the terms etc., fraction, ratio, proportion, fourth and third proportionals, finite and recurring decimals, root, factor, measure, multiple, power, numeration, average, prime, composite, concrete, and abstract numbers, true and bankers' (ordinary) discount, present worth, the funds, stocks, stocks at a premium or discount, brokerage and cancelling.

Proofs of the common arithmetical operations, and the 'short cuts' of Mental Arithmetic should be capable of easy and rapid reproduction, and our old friend 'demonstrate the rule for converting a "mixed repeater" into its equivalent vulgar fraction' should not be forgotten.

The relations of discount, interest, present worth and principal to each other, and of the three dimensions of space to one another must be thoroughly digested.

It will also be necessary to know how to calculate the areas of squares and rectangles (especially when faces of solids or hollow figures) and the cubical content of rectangular solids. Elementary Algebra, as far as the solution of simple equations, is of enormous assistance.

These formulæ should be committed to memory:—$A = L \times B$, $L = \frac{A}{B}$, $B = \frac{A}{L}$; $C = A \times H$, $C = L \times B \times H$, $A = \frac{C}{H}$, $H = \frac{C}{A}$; where L = length, B width or breadth, H = height, depth, or thickness, A = superficial area, and C = cubical content.

Note that a fraction (say $\frac{3}{4}$) means $3 \div 4$, $\frac{1}{4} \times 3$, and as 3 is to 4,— and that in clock sums respecting the position of the hands (or fingers), the principle is 'that the big finger gains on the little finger 55 minutes in every hour,'—and that there cannot be square or cubic measures of weight or value, but only of extent.

Problems out of the usual 'rut' involving the principles of the G.C.M. (H.C.F.), L.C.M., and compound interest, and those where rate per £ and per cent. are mixed, are not to be neglected. For Miscellaneous problems make extensive use of Capel's 'Catch Questions.'

ANSWERS TO CORRESPONDENTS.

We shall be pleased to reply briefly, and through this column, to any seeking information or advice.

Answers demanding urgency will be promptly forwarded per post on receipt of stamped and addressed envelope.

A Correction.—In the August Routine for Females, 2nd Lesson of Wednesday, Week two, please read 'between Discount and Interest' instead of 'between Principal and Present Worth.'

ENQUIRER (Middlesboro').—The Paraphrasing for Females is from 'Cæsar' only, and not from 'Addison,' whilst the language, style, and allusions should be from 'Addison only.' It is not safe, however, altogether to neglect these latter points in 'Cæsar.'

'Hopeful One,' 'Comus,' 'Insipiens (Incipiens ?)' answered per ordinary letter.

CENSOR.—We have at your command invoked our muse of literal translation with the following result—

'Now mid the lines of his embattled powers
  The lofty general of the pigmies stalks,
  Awful, majestic; solemnly he walks,
And with gigantic body all the rest o'ertowers,
  Rising amidst them, in his stature tall
  He by his elbow's height, exceeds them all.'

PUZZLED ONE.—We think that a little study will enable you to decipher the meaning. The first part of the Mnemonic represents the event, and the last three (or four) letters each denote a figure, thus giving the date. Try again. You will certainly make a very good writer, but at present your capitals require attention, and in the large-hand, you should join your letters higher up.

ROUTINE FOR SEPTEMBER. (MALES.)

<table>
<tr><th>DAY</th><th colspan="12">FIRST WEEK</th><th colspan="12">SECOND WEEK</th><th colspan="12">THIRD WEEK</th><th colspan="12">FOURTH WEEK</th></tr>
<tr><td>MONDAY</td><td colspan="4">(1) The Conscience Clause
(2) Law with regard to Half-Timers
(3) Law of School Fees
(4) Farming of Schools v. Fixed Salaries</td><td colspan="4">Revise all the Definitions and Axioms, &c., of Euclid, up to Book VI. (inclusive)</td><td colspan="4">Paraphrase last 14 Lines of Cæsar</td><td colspan="4">Euclid — Problems on Plane Loci</td><td colspan="4">Paraphrase Lines 617—635 of Comus</td><td colspan="4">Revise Geography of England</td><td colspan="4">The mixture of Southern, Eastern, and Northern Mythology of Comus</td><td colspan="4">Map of New Zealand</td><td colspan="4">History — Twenty-fifth chapter of McCarthy</td><td colspan="4">'Happiness consists not in Virtue's reward, but in Virtue itself.' Explain this aphorism, contrasting Habits and Character with Material Prosperity</td><td colspan="4">Revise Deductions of Books I. and II.</td><td colspan="4">The Prosody of Cæsar and Comus</td></tr>
<tr><td>TUESDAY</td><td colspan="4">Geography of British North America</td><td colspan="4">Arithmetic or Algebra</td><td colspan="4">Outlines of History, to end of William III.</td><td colspan="4">Arithmetic, Algebra, or Mensuration</td><td colspan="4">History — Revise McCarthy</td><td colspan="4">Music — Terms in common use relating to expression, pace, and style</td><td colspan="4">The Prosody of Cæsar and Comus</td><td colspan="4">Algebra — Logarithms</td><td colspan="4">Petition of Rights, Declaration of Rights, Bill of Rights, Acts of Settlement</td><td colspan="4">First 17 Props. of Euclid, Book VI.</td><td colspan="4">Revise Notes of Comus</td><td colspan="4">Treatment of 'Ringworm,' 'Stammering,' 'Squinting,' 'Itch,' and 'Breaking of Voice'</td></tr>
<tr><td>WEDNESDAY</td><td colspan="4">Algebra — Interest</td><td colspan="4">Fallacies — pp. 112—128 Jevon's Logic Primer</td><td colspan="4">Triangles are equal when ?</td><td colspan="4">Algebra — Annuities</td><td colspan="4">Euclid, Book II., and to Prop. 8, Book III.</td><td colspan="4">Write 30 lines of Composition on the character of Cicero</td><td colspan="4">Prove that only three regular figures can fill up space round a point</td><td colspan="4">Paraphrase from Essay on Addison 'We must look for the explanation of this seeming miracle.... of every remarkable word uttered in the deliberations of the legislature'</td><td colspan="4">What operations of man can affect climate ?</td><td colspan="4">Geography of British North America</td><td colspan="4">Arithmetic, Algebra, or Mensuration</td><td colspan="4">History — Revise McCarthy</td></tr>
<tr><td>THURSDAY</td><td colspan="4">Write 30 lines of Composition upon 'None but such as are good men can give good things'</td><td colspan="4">Write a Large-hand copy of 'Philanthrophy' and a Small-hand copy of 'Difficulties will make a wise man exert himself'</td><td colspan="4">Euclid, Book I.</td><td colspan="4">Geography of British North America</td><td colspan="4">Arithmetic, Algebra, or Mensuration</td><td colspan="4">Lives of Nelson, Fox, Wesley, Johnson, Milton, and Swift</td><td colspan="4">Arithmetic or Mensuration</td><td colspan="4">Algebra — Permutations and Combinations</td><td colspan="4">Revise Outlines of History — The Administrations of Justice</td><td colspan="4">All the Preface of Cæsar</td><td colspan="4">Arithmetic or Algebra</td><td colspan="4">General Directions to a P.T. for Drawing up Notes of Lessons</td></tr>
<tr><td>FRIDAY</td><td colspan="4">Preface to Cæsar from p. 5 to line 4 p. 18</td><td colspan="4">Geography of Currents and Tides</td><td colspan="4">Outlines of History to end of Anne</td><td colspan="4">Arithmetic, Algebra, or Mensuration</td><td colspan="4">Canon Warburton's Article in our August issue on Pestalozzi</td><td colspan="4">Euclid — Maxima and Minima</td><td colspan="4">What does the present disposition of Flora and Fauna teach us concerning the former disposition of Land ?</td><td colspan="4">Euclid, Book IV.</td><td colspan="4">Give an account of the 'Coolness' between Pope and Addison</td><td colspan="4">Deductions of Euclid, Book VI.</td><td colspan="4">The Quotations, Latin, Greek, and English, of Addison</td><td colspan="4">Map of British North America</td></tr>
<tr><td>SATURDAY</td><td colspan="3">Important Dates to end of Anne — The Cabinet and Ministry</td><td colspan="3">Preface to Cæsar to middle of p. 29</td><td colspan="3">Algebra — Annuities</td><td colspan="3">Revise 'Laws of Health as applied to School premises'</td><td colspan="3">Preface and Dramatis Personæ of Comus — Revise Plot of Comus</td><td colspan="3">'Form IX.' and its items</td><td colspan="3">Euclid, Book III., Prop. 9 to end</td><td colspan="3">Algebra — Difficult Equations</td><td colspan="3">Draw rough 'Sketch Maps'</td><td colspan="3">Arithmetic or Mensuration</td><td colspan="3">Outlines of History to end of George I.</td><td colspan="3">Algebra — The Binomial Theorem</td><td colspan="3">Arithmetic</td><td colspan="3">Important Dates to end of George II.</td><td colspan="3">Algebra — The Binomial Theorem</td><td colspan="3">Write out (for future use) a Summary of Canon Warburton's last Article on Pestalozzi</td></tr>
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ROUTINE FOR SEPTEMBER. (FEMALES.)

<table>
<tr><th>DAY</th><th colspan="12">FIRST WEEK</th><th colspan="12">SECOND WEEK</th><th colspan="12">THIRD WEEK</th><th colspan="12">FOURTH WEEK</th></tr>
<tr><td>MONDAY</td><td colspan="4">(1) The Conscience Clause.
(2) Law of Half-Timers.
(3) Law of School Fees.
(4) Farming of Schools v. Fixed Salaries</td><td colspan="4">Analyse and Parse difficult words of lines 31-42 of Cæsar, Act V. Scene 4</td><td colspan="4">Geography of our European Possessions</td><td colspan="4">War of the French Revolution (1793)</td><td colspan="4">Discount</td><td colspan="4">Geography of our Asiatic Possessions (excluding India and Burmah)</td><td colspan="4">What are the uses of Lime-juice, Camomile, Cod Liver Oil, Nitrate of Silver, and Ipecacuanha?</td><td colspan="4">Fallacies.
—
pp. 112-128 Jevon's Logic Primer</td><td colspan="4">Maps of St. Lawrence and the Murray</td><td colspan="4">Stocks</td><td colspan="4">What do we export to our principal Possessions?</td><td colspan="4">Describe the character of Cicero, as depicted in the play</td></tr>
<tr><td>TUESDAY</td><td colspan="4">The Cabinet (see last month's article).
The Privy Council.
The Ministry</td><td colspan="4">Compound Proportion</td><td colspan="4">Paraphrase lines 57-78 of Cæsar, Act I. Scene 3</td><td colspan="4">Map of the North Sea and Geographical Revision</td><td colspan="4">What 'extraordinary expenses' should a working-man provide for, and to what extent weekly?</td><td colspan="4">Practise diagonal and plain darns</td><td colspan="4">Revise 'Laws of Health as applied to School Premises'</td><td colspan="4">What accessions of Territory have been ours since 1885?</td><td colspan="4">Our scattered Oceanic Possessions</td><td colspan="4">History.
—
Dates</td><td colspan="4">How should Herring, Mackerel, Cod, and Salmon be cooked? What is the special value of a fish diet?</td><td colspan="4">Cut out the Sleeve and Collar of a Woman's Nightdress, and Wristbands of a Boy's Shirt</td></tr>
<tr><td>WEDNESDAY</td><td colspan="4">What parts of our food tend respectively to produce Warmth, Fat, Muscle, Strength, and Size of Bone?</td><td colspan="4">General directions to a P. T. for drawing up Notes of Lessons</td><td colspan="4">Practise Needlework Diagrams</td><td colspan="4">Spinning Jenny (1764), Spinning Machine (1768), The Mule (1776), and their effects on Trade and Population</td><td colspan="4">Proofs of Arithmetical Rules</td><td colspan="4">The Prosody of Cæsar</td><td colspan="4">Revise Geography of British Isles</td><td colspan="4">How should meat be stewed (1) to make soup, (2) to be eaten? Give reasons for the different methods</td><td colspan="4">Canon Warburton's Article, in our August issue, on Pestalozzi</td><td colspan="4">Who were Budgell, Phillips, Tickell, Wharton, John Dennis, and Miss Aikin?</td><td colspan="4">In how many pieces should the three required garments be cut?</td><td colspan="4">'Form IX.' and its items</td></tr>
<tr><td>THURSDAY</td><td colspan="4">Maps of the Ganges and the Shannon</td><td colspan="4">Practise setting-in 'gathers' and feather-stitching</td><td colspan="4">Insurance</td><td colspan="4">Treatment of 'Ringworm,' 'Stammering,' 'Squinting,' 'Itch,' and 'Breaking of Voice'</td><td colspan="4">Describe any systems of 'Penny Dinners' that you are acquainted with</td><td colspan="4">Lives and Works of Johnson, Goldsmith, Bentham, Cowper, Burns, and Gibbon</td><td colspan="4">Analyse and Parse difficult words of lines 33-43 of Cæsar, Act I. Scene 1</td><td colspan="4">Ceylon, 1795-6
—
African Company, 1750
—
Newfoundland (1714) and the Fishery Question</td><td colspan="4">The uses of Colonies and Dependencies, giving examples</td><td colspan="4">Draw rough 'Sketch Maps'</td><td colspan="4">Revise 'Food for the Sick' from Text-Book</td><td colspan="4">Present-Worth</td></tr>
<tr><td>FRIDAY</td><td colspan="4">Revise 'Household Management' from Text-Book</td><td colspan="4">Square Root and Fourth Root, etc.</td><td colspan="4">India under Warren Hastings and Lord Cornwallis.
—
Battle of Seringapatam</td><td colspan="4">Paraphrase lines 71-92 of Cæsar, Act III. Scene 2</td><td colspan="4">Cut out the left half of a child's muslin pinafore</td><td colspan="4">Music
—
Terms in common use relating to expression, pace, and style</td><td colspan="4">'High Interest is bad Security.' Explain this axiom, and give instances of its application</td><td colspan="4">Describe the character of Addison</td><td colspan="4">Practise Seaming, Felling, and Simple and Counter Hemming</td><td colspan="4">'Happiness consists not in Virtue's reward but in Virtue itself.' Explain this aphorism, contrasting Habits and Character with material Prosperity</td><td colspan="4">Re-read the first half of Addison</td><td colspan="4">History
—
Dates</td></tr>
<tr><td>SATURDAY</td><td colspan="3">Addison's 'Campaign' 'departed from a ridiculous fashion.' What fashion was this; and what better style did he introduce?</td><td colspan="3">The Whiteboys.
United Irishmen (1791).
Orangemen (1795).
Vinegar Hill (1798)</td><td colspan="3">General view of our Empire</td><td colspan="3">Write a Largehand copy of 'Philanthropy,' and a Smallhand copy of 'Difficulties will make a wise man exert himself'</td><td colspan="3">Stocks</td><td colspan="3">Preface to Cæsar, from page v. to line 4, page xviii.</td><td colspan="3">How would you diet (1) a patient after a lengthened fast? (2) a person suffering from skin disease?</td><td colspan="3">Plain Needlework</td><td colspan="3">Arithmetic
—
Miscellaneous Problems</td><td colspan="3">Preface to Cæsar, to middle of page xxix.</td><td colspan="3">Practise any 'Needlework'</td><td colspan="3">War of the French Revolution (1793)</td><td colspan="3">The Prosody (and Scanning) of Cæsar</td><td colspan="3">General view of our Empire</td><td colspan="3">Arithmetic
—
Miscellaneous Problems</td><td colspan="3">Write out (for future use) a Summary of Canon Warburton's last article on Pestalozzi</td></tr>
</table>

Jeanne d'Arc, by Lamartine.

TRANSLATED BY A. M. BOWER,

Late Master in University College School, London.

CHAPTER XV.—*continued.*

JEANNE D'ARC.	JOAN OF ARC.
Baudricourt la congédia	Baudricourt dismissed her
pour réfléchir,	in order to reflect,
craignant sans doute	being afraid no doubt
de trop mépriser ou de trop croire	of despising or believing too much
dans un temps où	at a time when
l'incrédulité autant que la croyance	unbelief as well as faith
pouvait lui être imputée	might be reproached him
à faute par la voix publique.	as a fault by the voice of the nation.
Il en référa prudemment au clergé,	He prudently submitted the case to the clergy,
juge en matière surnaturelle.	the (proper) judges in supernatural matters.
Il consulta le curé de Vaucouleurs.	He consulted the parish priest of Vaucouleurs.
Ils allèrent ensemble avec solennité	They went solemnly together
visiter la jeune paysanne	to visit (see) the young peasant
chez sa cousine,	at the house of her cousin,
la femme du charron.	the wheelwright's wife.
Le curé, pour être prêt	The parish priest, in order to be ready
à toute occurrence,	for every eventuality,
avait revêtu ses habits sacerdotaux,	had put on his priestly vestments
armure contre l'esprit tentateur.	(as) armour against the evil spirit.
Il exorcisa Jeanne,	He exorcised Joan,
au cas où elle serait obsédée	in case she should be possessed
d'un démon, et la somma	by an evil spirit, and summoned her
de se retirer si elle était	to depart if she had
en commerce avec Satan.	dealings with Satan.
Mais les démons de Jeanne	But the evil spirits of Joan
n'étaient que sa piété et son génie.	were only her piety and her genius.
Elle subit l'épreuve	She underwent the proof
sans donner aucun scandale	without giving any scandal
au prêtre et à l'homme de guerre.	to the priest and the warrior.
Ils se retirèrent indécis et touchés.	They withdrew undecided and deeply moved.

XVI.

Le bruit de cette visite	The noise of this visit
du gouverneur et du prêtre	of the Governor and priest
chez la femme du charron	to the wheelwright's house
étonna et édifia la petite ville.	astonished and edified the small town.
Le peuple de toute condition	People of all ranks,
et les femmes surtout s'y portèrent.	especially women, came to see her.
La mission de Jeanne devint	Joan's mission became
la foi de quelques-uns	an article of faith to some
et l'entretien de tous.	and of conversation to all.
Le bruit avait trop éclaté	The report had spread too far
pour qu'il fût loisible	for it to be possible
à Baudricourt de l'étouffer.	for Baudricourt to stifle it.
L'opinion l'accusait déjà	Public opinion already accused him
d'indifférence et de mollesse.	of indifference and want of energy.
'Négliger un tel secours du ciel,	'To despise such assistance from heaven,
n'était-ce pas trahir	was it not betraying
le Dauphin et la France?'	the Dauphin and France?'
Un gentilhomme des environs,	A gentleman of the neighbourhood,
étant venu voir Jeanne	having gone to visit Joan
comme les autres, lui dit,	like the others, said to her,
en manière d'accusation contre Baudricourt:	by way of accusing Baudricourt:
'Eh bien, ma mie,	'Well, my dear maid,
il faudra donc que le roi soit chassé	the King must, I suppose, be banished
et que nous devenions Anglais?'	and we must become English?'
Jeanne mêla ses plaintes	Joan mingled her complaints
à celles du gentilhomme et du peuple,	with those of the gentleman and the nation,
mais elle parut moins se lamenter	but she seemed less to lament
sur elle-même que sur la France;	over herself than over France;
et, se rassurant sur la promesse	and, strengthening herself with the promise,
qu'elle avait entendue d'en haut:	which she had heard from above:
'Cependant, dit-elle,	She exclaimed: 'Nevertheless,
il faudra bien qu'avant la mi-carême	it is necessary that before mid-Lent
on me conduise au Dauphin,	I must be taken before the Dauphin,
dussé-je, pour y aller,	even if I should be obliged, to reach there,
user mes jambes jusqu'aux genoux.	to wear away my legs even to the knees.
Car personne au monde, ni rois,	For no one in the world, neither kings,
ni ducs, ni fille du roi d'Ecosse,	nor dukes, nor the King of Scotland's daughter,
ne peuvent reprendre le royaume de France;	can recover the kingdom of France;
et il n'y a pour lui	and there is for him
d'autres secours que moi-même,	no other help than myself,
quoique j'aimasse mieux,'	although I should have preferred,'
ajouta-t-elle avec tristesse,	she added sadly,
'rester à filer	'to stay at home spinning
près de ma pauvre mère!...	near my poor mother.
Car je sais bien que	For I know very well that
batailler n'est pas mon ouvrage;	fighting is not my work;
mais il faut que j'aille et que je fasse	but I must go and do
ce qui m'est commandé,	what is commanded me,
car mon Seigneur le veut.'	for my Master wills it.'
On lui demanda:	They asked her:
'Et qui est votre Seigneur?'	'And who is your Master?'
Elle répondit: 'C'est Dieu!'	She answered: 'God!'
Deux chevaliers présents s'émurent,	Two knights present were deeply moved;
l'un jeune, l'autre vieux.	the one young, the other old.
Ils lui promirent sur leur foi,	They promised her, on their honour,
la main dans sa main,	with their hands in hers,
qu'avec l'aide de Dieu	that with God's help
ils lui feraient parler au roi.	they would enable her to speak to the king.

XVII.

Pendant ces délais	During these delays
qui semblaient commandés	which seemed necessary
par le respect même pour le Dauphin,	out of respect for the Dauphin,
Baudricourt conduisit Jeanne	Baudricourt conducted Joan
au duc de Lorraine,	to the Duke of Lorraine,
de qui il relevait à Vaucouleurs,	under whom he held his fief at Vaucouleurs,
afin de décharger sa responsabilité	in order to discharge his responsibility
et de prendre ses ordres.	and receive his orders.
Le duc vit Jeanne et l'interrogea	The Duke saw Joan and questioned her
sur une maladie	about a disease
dont il était en ce moment affligé.	by which at that time he was afflicted.
Elle ne lui parla que	She spoke to him
de guérir son âme	only of healing his soul
en se réconciliant avec la duchesse	by becoming reconciled to the Duchess
dont il était séparé.	from whom he was separated.
Baudricourt la ramena à Vaucouleurs.	Baudricourt took her back to Vaucouleurs.
Pendant le voyage et le séjour	During the journey and the residence
de Jeanne chez le duc de Lorraine,	of Joan at the Duke of Lorraine's,
le Dauphin lui-même avait été avisé	the Dauphin himself had been informed
par lettres de la merveille de Domremy.	by letters of the wonderful apparition of Domremy.
Quelques-uns pensent que	Some people think that
Baudricourt avait voulu prendre,	Baudricourt had wished to take,
avant toute résolution,	before (adopting) any resolution,
les ordres du Dauphin et de sa belle-mère,	the orders of the Dauphin and of his mother-in-law,
la reine Yolande d'Anjou :	Queen Yolande d'Anjou :
le Dauphin, la reine Yolande	the Dauphin, the Queen Yolande
et le duc de Lorraine	and the Duke of Lorraine
devaient se concerter avec Baudricourt	were to concert measures with Baudricourt
pour faire profiter à leur cause	to turn to the advantage of their side (cause)
l'apparition d'une jeune,	the appearance of a young,
belle et pieuse fille,	beautiful, and pious maiden,
digne de protection divine	worthy of divine protection
pour les peuples, d'enthousiasme	for the nations, of enthusiasm
pour l'armée, de délivrance	for the army, of deliverance
pour le royaume.	for the kingdom.
Cette opinion n'a rien que de vraisemblable,	This opinion is most likely,
et la politique d'une pareille foi	and the policy of such a belief
n'en exclut pas la sincérité	does not exclude its sincerity
dans un siècle où les cours et les camps	in an age when courts and camps
partageaient toutes les croyances du peuple.	shared all the beliefs of the people.
Les préparatifs pour le voyage	The preparations for the journey
et pour la réception de Jeanne à la cour,	and for the reception of Joan at the court,
et les respects du Dauphin	and the great respect of the Dauphin
et de la reine Yolande	and of Queen Yolande,
pour elle à son arrivée,	for her on her arrival,
montrèrent assez	were sufficient proof
qu'on attendait le prodige	that they expected a marvel
et qu'on désirait le faire éclater.	and they ardently longed to see it manifested.

XVIII.

Les habitants de Vaucouleurs achetèrent	The inhabitants of Vaucouleurs bought
à Jeanne un cheval du prix de seize francs	for Joan a horse for sixteen francs,
et des habits d'homme de guerre	and a soldier's dress
pour protéger sa personne	to protect her person,
autant que pour manifester sa mission guerrière.	as well as to indicate her warlike mission.
Baudricourt lui donna une épée.	Baudricourt presented her with a sword.
Le bruit de son départ	The report of her departure
pour l'armée s'étant répandu	for the army having spread
jusqu'à Domremy, son père,	as far as Domremy, her father,
sa mère, ses frères accoururent	mother and brothers hastened
pour la retenir et la reprendre.	to detain her and take her home.
Elle pleura avec eux, mais ses larmes	She wept with them, but her tears,
amollissant son cœur,	(although) they softened her heart,
ne purent amollir sa résolution.	(yet) could not weaken her resolution.
Elle partit, en compagnie	She set out, in company
des deux gentilshommes	with two noblemen
et de quelques cavaliers de leur suite,	and some cavaliers of their suite,
pour Chinon où était le le Dauphin.	for Chinon, where the Dauphin was.
Son escorte lui fit traverser	Her escort made her travel
rapidement les provinces	rapidly through the provinces
où dominaient les Anglais et les Bourguignons,	in which the English and Burgundians held sway,
dans la crainte que	from the fear that
leur dépôt ne leur fût enlevé.	their charge might be carried off from them.
Indécis d'abord sur la nature	Uncertain at first as to the nature
des inspirations de la jeune fille,	of the inspirations of the young girl,
tantôt ils la vénéraient	sometimes they reverenced her
comme une sainte,	as a saint,
tantôt ils s'en éloignaient	at other times they kept at a distance from her
comme d'une sorcière	as from a sorceress
possédée d'un mauvais génie.	possessed by an evil spirit.
Quelques-uns même délibérèrent	Some even deliberated
secrètement s'ils ne s'en déferaient pas	secretly whether they should not get rid of her
en route en la précipitant	during the journey, by hurling her
dans quelque torrent des montagnes	down into some mountain stream
et en attribuant sa disparition	and attributing her disappearance
à un enlèvement du démon.	to the carrying off of a demon.
Souvent, près d'exécuter leur complot,	Often (when) on the point of executing their project,
ils furent retenus	they were restrained
comme par une main divine.	as by a divine hand.
La jeunesse, la beauté, l'innocence	The youth, beauty, innocence,
et la sainte candeur de la jeune fille	and the saintly candour of the young girl
furent sans doute le charme	were doubtless the charm
qui fléchit leurs cœurs et leurs bras.	which subdued their hearts and arms.
Partis incrédules,	(Although they) set out incredulous,
ils arrivèrent convaincus.	they arrived convinced.

XIX.

La cour errante était	The wandering court were
au château de Chinon, près de Tours.	at the castle of Chinon, near Tours.
On y attendait l'inspirée de Vaucouleurs	There they awaited the inspired (maiden) of Vaucouleurs
avec des sentiments divers.	with various feelings (thoughts).
Les conseillers réputés les plus sages	The councillors, reputed the wisest,
déconseillaient le Dauphin d'accueillir	endeavoured to dissuade the Dauphin from receiving
et d'écouter une infant qui,	and listening to a young girl who,
si elle n'était pas un instrument	if she were not an instrument
de l'ange des ténèbres,	of the angel of darkness,
était au moins la messagère	was at least the messenger
de sa propre illusion.	of her own illusions.
D'autres, plus crédules ou plus légers,	Others, more credulous or more thoughtless,
poussaient le Dauphin à consulter du moins cet oracle.	urged the Dauphin at least to consult this oracle.
La reine Yolande et les favorites	Queen Yolande and her favourites
étaient fières que le salut vînt d'une femme.	were proud that deliverance should come from a woman.
Faciles à croire, portées à séduire	Credulous (= easy of belief), apt to lead astray
et à être séduites,	and to be led astray,
elles sentaient que les moyens humains	they perceived that all human means
de relever la cause du roi	of restoring (reviving) the king's cause
étaient épuisés et qu'un ressort surnaturel,	were exhausted, and that a supernatural impulse,
vrai ou supposé,	real or supposed,
pouvait seul rendre l'enthousiasme	could alone restore enthusiasm
avec l'espérance aux soldats et aux peuples.	with hope to the soldiers and people.
'C'était peut-être Dieu	'It was perhaps the Almighty
qui suscitait ce secours.'	who raised up (sent) this help.'
Politique ou crédulité,	(Whether it was) policy or credulity,
tout était bon	all means were acceptable
pour une cause vaincue et désespérée.	to a vanquished and despairing cause.
Le Dauphin flottant, comme le jeunesse,	The Dauphin wavering, like youth,
de l'amour à la gloire	between love and glory,
et des conseils graves aux conseils féminins,	grave counsels and woman's advice,
était à une de ces crises	was in one of those crises
d'affaissement moral où	of moral prostration when
l'on est enclin à tout croire	we are inclined (ready) to believe everything
parce qu'on n'a plus rien à attendre.	because we have nothing more to expect.

Grammatical Notes, Questions, Sentences, and Pieces for Translation to Jeanne d'Arc.

CHAPTER XVI.

S'y portèrent (carried themselves there). How do you do = comment vous portez-vous = how do you carry yourself? or comment allez-vous? (= how goes it ?). Ma amie was formerly m(a)amie, my dear girl. In old French m', t', s', were used instead of ma, ta, sa, before a fem. sing. noun beginning with a vowel. In *dussé*-je, *puissé*-je, *parlé*-je, the acute accent is only euphonic (placed there for the sake of sound). User *de* (= to use); abuser *de* (= to abuse); but *user*, to wear out, and *abuser*, to deceive, take an accusative (no de). S'émouvoir, to move oneself, to be moved. *Ils lui feraient parler au roi.* This construction seems a violation of the rule that *faire* takes an accusative ***not a dative as here*** after it if the ***infinitive*** which follows *faire* has not an accusative after itself. If, however, any ambiguity would arise the dative must be used. Ils *la* feraient parler, would mean, *they would force her to speak.*

CHAPTER XVII.

Faire profiter à leur cause *l'apparition* (note the order). N'a rien que de vraisemblable = has nothing but (what is) probable = is probable. Voyage = journey, voyage, travel.

CHAPTER XVIII.

Une maison *in*-habitée = an *un*-inhabited house. Seize francs = seize livres: the livre = then 5 to 9 francs. Gentilshommes = noblemen, *not Gentlemen*, which is the same as in English.

CHAPTER XIX.

Dé-conseiller (*dé* in composition is a negative).

(To be continued.)

The Glass of Water; or, Cause and Effect.

(Comedy in Five Acts.)

LE VERRE D'EAU; OU, LES EFFETS ET LES CAUSES.

(Comédie en Cinq Actes.)

Scène III.	Scene III.
	Abigail.
Et pourquoi ne pas rompre avec elle...	Why not break with her?
pourquoi ne pas se soustraire à une domination insupportable?	Why not escape from such intolerable tyranny?
	Bolingbroke.
Cela, mon enfant, est plus difficile	That, child, is more difficult
à vous expliquer. Dans notre pays...	to explain to you. In our country,
en Angleterre, Masham vous le dira,	in England, Masham will tell you the same,
ce n'est pas la reine,	it is not the Queen that reigns
c'est la majorité qui règne;	but the majority;
et le parti whig, dont Marlborough est le chef,	and the Whig party, of whom Marlborough is the head,
a non-seulement pour lui l'armée,	has not only on its side the army,
mais le parlement!...	but the Parliament!
La majorité leur est acquise!	They have a majority.
et la reine Anne, dont on vante le règne glorieux,	Queen Anne, whose glorious reign they boast of,
est forcée de subir des ministres	is forced to accept ministers
qui lui déplaisent,	who are displeasing to her,
une favorite qui la tyrannise et des amis	a favourite who tyrannizes over her, and friends
qui ne l'aiment pas.	who do not love her.
Bien plus...ses intérêts de cœur,	More than that, her dearest interests,
ses désirs les plus chers	her most cherished wishes
l'obligent presque à faire la cour	almost compel her to pay court
à l'altière duchesse, car son frère,	to the haughty duchess; for her brother
le dernier des Stuarts,	the last of the Stuarts,

que la nation a banni,	whom the nation banished,
ne peut être rappelé en Angleterre	cannot be recalled to England
que par un bill du parlement,	without a Bill of Parliament,
et ce bill, c'est encore la majorité,	and (as to) this bill, it is the majority again,
c'est le parti Marlborough	the party of Marlborough
qui peut seul l'appuyer	who alone can support it
et le faire réussir...	and carry it through Parliament (pass it).
La duchesse l'a promis...	The duchess has promised it ;
aussi tout cède à son influence.	therefore, everything yields to her influence.
Surintendante de la reine,	Superintendent of the Queen's household,
elle ordonne, règle, décide,	she orders, regulates, decides,
nomme à tous les emplois,	appoints to all employments (posts),
et un choix fait sans son aveu excitera sa défiance,	and a choice made without her assent would rouse her distrust,
sa jalousie, son refus peut-être.	her jealousy, and perhaps meet with her refusal.
Voilà pourquoi, mes amis, la reine	This is why, my friends, the Queen
me paraît aujourd'hui bien hardie,	appears to me very bold,
et la nomination d'Abigaïl bien douteuse encore !	and the appointment of Abigail still very doubtful !

Abigail.

Ah ! s'il en est ainsi !...	Ah ! if such is the case !
si cela dépend seulement de la duchesse,	If that depends on the duchess alone,
rassurez-vous !...j'ai quelque espoir !	be easy, as I have yet some hopes !

Masham.

Et lequel ?	What hopes (have you) ?

Abigail.

Je suis un peu sa parente.	I am slightly related to her.

Bolingbroke.

Vous, Abigaïl ?	You, Abigail ?

Abigail.

Eh ! oui vraiment ... par mésalliance !	Yes, of course—by mis-alliance,
un cousin à elle, un Churchill,	a cousin of hers, a Churchill,
s'était brouillé avec sa noble famille	quarrelled with his noble family
en épousant ma mère !	when he married my mother !

Masham.

Est-il possible ?...parente de la duchesse !	Is it possible ? A relation of the duchess !

Abigail.

Parente bien éloignée...	A very distant one.
et jamais je ne m'étais présentée devant elle,	I never troubled her with my presence,
parce qu'elle avait refusé autrefois	because she had formerly refused
de recevoir et de reconnaître ma mère...	to receive and acknowledge my mother.
mais moi...pauvre fille...qui ne lui demanderai rien	But I (though a) poor girl, will ask her for nothing
que de ne pas me nuire...	except not to hurt me,
que de ne pas s'opposer aux bontés de la reine...	nor to oppose the Queen's goodness.

Bolingbroke.

Ce n'est pas une raison...	That is not a reason.
vous ne la connaissez pas...	You do not know her.
Mais cette fois du moins je puis vous servir,	But this time at least I can help you,
et je le ferai...dussé-je m'attirer sa haine !	and I will do it, even should I draw down her anger on myself.

Abigail.

Ah ! que de bontés !	Oh ! how very kind of you !

Masham.

Comment les reconnaître jamais !	How can we ever thank you !

Bolingbroke.

Par votre amitié.	By your friendship.

Abigail.

C'est bien peu !	That is very little.

Bolingbroke.

C'est beaucoup ! pour moi, homme d'état...	It is very much for me, a statesman,
qui n'y crois guère...	who have not much faith in it.
(*Vivement*) Je crois à la vôtre et j'y compte !...	(*Warmly*) I believe in yours and I rely upon it.
(*Leur prenant la main*) Entre nous désormais...	(*Taking hold of their hands*) Henceforth between us
alliance offensive et défensive !	an alliance offensive and defensive.

Abigail.

[*souriant*	[*smiling*
Alliance redoutable !	A formidable alliance !

Bolingbroke.

Plus que vous ne croyez peut-être,	More formidable perhaps than you imagine,
et grâce au ciel, la journée sera bonne !	and thank Heaven, this day will be a lucky one !
deux succès à emporter !... la place d'Abigaïl...	Two successes to win—a place for Abigail...
et une autre affaire qui me tient au cœur...	and another affair which I have much at heart
une lettre que je voudrais à tout prix	a letter which I should like at any cost
faire arriver ce matin entre les mains de la reine...	to get this morning into the Queen's hands.
j'en attends et j'en cherche les moyens...	I am waiting for and seeking the means (to send it).
Ah ! si Abigaïl était nommée !	Ah ! if Abigail only were appointed !
si elle était reçue parmi les femmes de Sa Majesté,	If she were received among the ladies of her Majesty,
tous mes messages parviendraient	all my messages would reach her (the Queen)
en dépit de la duchesse.	in spite of the Duchess.

Masham.

[*vivement.*	[*warmly*
N'est-ce que cela ?...	Is that all ?
je puis vous rendre ce service.	I can do you this service.

Bolingbroke.

Est-il possible !	Is it possible !

Masham.

Tous les matins à dix heures,	Every morning at 10 o'clock
et les voici bientôt,	and it will soon be ten,
je porte à Sa Majesté pendant son déjeûner	I take her Majesty while at her breakfast
(*prenant le journal sur la table à droite*)	(*taking up the newspaper from the table on the right*)

la *Gazette du monde élégant*	the *Gazette of the fashionable world*
et des gens à la mode,	*and of people à la mode,*
qu'elle parcourt en prenant son thé ;	which she skims over as she sips her tea ;
elle regarde les gravures,	she looks at the engravings
et parfois me dit de lui lire	and sometimes tells me to read her
les articles de bals et de raouts.	the articles about balls and routs.

Bolingbroke.

A merveille !...quel bonheur	Excellent ! What luck
que la royauté lise le journal des modes...	that royalty should read the *Fashionable Gazette*
c'est le seul qu'on lui permette...	it is the only one allowed her.
(*Glissant une lettre sous la couverture du journal*)	(*Slipping a letter under the cover of the journal*)
La lettre du marquis au milieu	The Marquis's letter in the midst
des vertugadins et des falbalas.	of farthingales and furbelows.
Et pendant que nous y sommes...	And while we are talking about it
(*Tirant un journal de sa poche*).	(*Taking a newspaper out of his pocket*).

Abigail.

Que faites-vous ?	What are you going to do ?

Bolingbroke.

Un numéro du journal *l'Examinateur*	A copy of the *Examiner*
que je glisse sous la couverture.	which I am going to slip under the cover.
Sa Majesté verra comment l'on traite	Her Majesty will see how they treat
le duc et la duchesse de Marlborough...	the Duke and Duchess of Marlborough.
elle et toute sa cour en seront indignées...	She and her whole court will be indignant at it.
Voilà dix heures, allez, Masham...allez !	There's ten o'clock, away with you, Masham, go !

Masham.

[*sortant par la porte à droite.*	[*Exit on the right.*
Comptez sur moi !	Trust to me.

Scène IV.	Scene IV.
Abigaïl, Bolingbroke.	Abigail, Bolingbroke.

Bolingbroke.

Vous le voyez ! le traité de la triple alliance	You see, the treaty of the triple alliance
produit déjà ses effets...	already produces results.
c'est Masham qui nous protége et nous sert !	Masham is our patron and serves our interests.

Abigail.

Lui ! peut-être !...	He, well yes,
mais moi qui suis si peu de chose !	but I am of so little use.

Bolingbroke.

Il ne faut pas mépriser les petites choses,	We must not despise little things,
c'est par elles qu'on arrive aux grandes !...	through them we arrive at great ones....
Vous croyez peut-être, comme tout le monde,	You think, perhaps, like everyone else,
que les catastrophes politiques, les révolutions,	that political crises, revolutions,
les chutes d'empire, viennent de causes	the fall of empires, spring from serious,
graves, profondes, importantes...Erreur !	profound and important causes. Not at all.
Les états sont subjugués	States are conquered
ou conduits par des héros,	and governed by heroes
par des grands hommes ;	and great men ;
mais ces grands hommes sont menés eux-mêmes	but these great men are themselves carried away
par leurs passions, leurs caprices, leurs vanités ;	by their passions, their caprices and their vanities ;
c'est-à-dire par ce qu'il y a	that is to say, by everything that is
de plus petit et de plus misérable au monde.	meanest and lowest in the world.
Vous ne savez pas qu'une fenêtre	You do not know that a window
du château de Trianon,	in the castle of Trianon,
critiquée par Louis XIV.	criticised by Louis XIV.,
et défendue par Louvois,	and defended by Louvois,
a fait naître la guerre	was the cause of the war
qui embrase l'Europe en ce moment.	which is now setting Europe in flames.
C'est à la vanité blessée d'un courtisan	It is to the wounded vanity of a courtier
que le royaume a dû ses désastres ;	that the kingdom owes its misfortunes ;
c'est à une cause plus futile encore	it is to a still more trifling cause
qu'il devra peut-être son salut.	that it will owe perhaps its safety.
Et sans aller plus loin...	And without going any further,
moi qui vous parle, moi, Henri de Saint-Jean,	I who now speak to you, I, Henri de St. Jean,
qui jusqu'à vingt-six ans fus regardé	who until I was six and twenty years old, was looked upon
comme un élégant, un étourdi,	as a fashionable gentleman, a thoughtless fellow,
un homme incapable d'occupations sérieuses...	a man incapable of serious work—
savez-vous comment tout d'un coup	do you know how all at once
je devins un homme d'état,	I became a statesman,
comment j'arrivai à la chambre,	how I became a member of the House of Commons,
aux affaires, au ministère ?	how I received a high appointment and became a Minister ?

Abigail.

Non vraiment.	Not at all.

Bolingbroke.

Eh bien ! ma chère enfant,	Well, my dear child,
je devins ministre parce que	I became a Minister because
je savais danser la sarabande ;	I knew how to dance the sarabande ;
et je perdis le pouvoir	and I lost power
parce que j'étais enrhumé.	because I caught a cold.

Abigail.

Est-il possible ?	Is it possible ?

Bolingbroke.

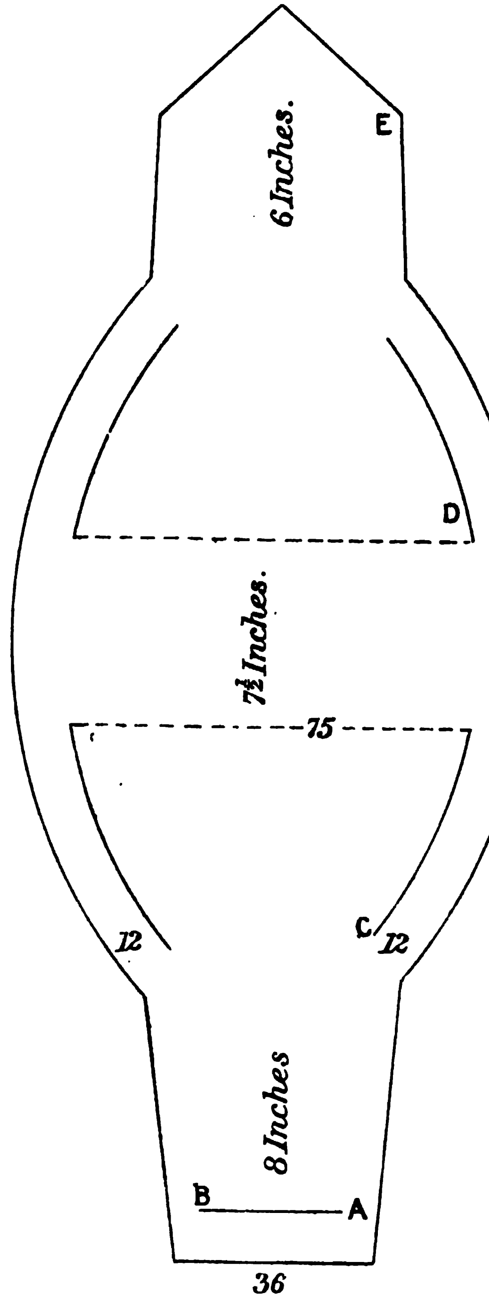
[*regardant du côté de l'appartement de la reine.*	[*looking towards the Queen's apartment.*
Je vous conterai cela un autre jour,	I will tell you all about it some day,
quand nous aurons le temps.	when we have time.
Et maintenant, sans me laisser abattre,	And now, without allowing myself to be discouraged,
je combats à mon poste,	I am fighting at my post
dans les rangs des vaincus !...	in the ranks of the vanquished.

(To be continued.)

Knitting Maps.

BY MRS. J. D. HARRIS.

LADY'S BELT.



2 Bone pins. No. 11 Chamber's bell gauge.
3 skeins knitting cotton. No. 3. 3 thread.

Cast on 36 stitches. Knit 1 inch.

To form the Slit.

A. Knit 6. Cast off all but the 6 last.

B. In the reverse row, knit 6. Cast on 24. Knit 8 inches plain.

To increase.

C. Knit 12. Make a stitch, by picking up a loop. Knit to within 12 of the end. Make another stitch. Knit 12.
The reverse row plain knitting.
Continue these increasings till you have 75 stitches.
Knit 7½ inches plain, or longer if required.

To decrease.

D. Knit 12. Knit 2 together. Knit to within 14 of the end. Knit 2 together.
The reverse row plain knitting.
Decrease till you have 36 stitches left. Knit 6 inches.

E. Slip the first stitch. Knit the 2 next together at the beginning of every row till you have only 3 stitches left.
Slip 1. Knit 2 together, pull the slipped stitch over.
Sew a tape to each end.

Pupil Teacher Examination Papers. (Scotland.)

28TH APRIL, 1888.

END OF FIRST YEAR.

Needlework.

Gather 6 inches of material and set it into a stitched band (3 inches).

Show two ways of sewing on a tape.

Latin.

1. Decline together *pulchra virgo* and *eadem facies.*
2. Under what circumstances does the ablative of the third declension end in *i*. Give examples.
3. Write out the future indicative active of *rego*, and the imperfect subjunctive passive of *audio*. Give the English of *amandus, docturus, rectum iri, auditu.*
4. Translate into English and parse the words in *italics*:—
   (*a.*) Romulus *urbem* Romam *vocat.*
   (*b.*) Amicus meus in *ea domo* habitat, *quam* frater tuus *ædificavit.*

OPTIONAL.

Translate into Latin:—
(*a.*) The Consul himself was wounded.
(*b.*) The King praised the soldiers, because they fought very bravely.

LATIN.

		SING.	PLUR.
(1)	N.	Pulchra virgo	pulchræ virgines
	G.	Pulchræ virginis	pulchrarum virginum
	D.	Pulchræ virgini	pulchris virginibus
	Acc.	Pulchram virginem	pulchras virgines
	V.	Pulchra virgo	pulchræ virgines
	Abl.	Pulchra virgine	pulchris virginibus
	N.	Eadem facies	eaedem facies
	G.	Ejusdem faciei	
	D.	Eidem faciei	
	Acc.	Eandem faciem	easdem facies
	Abl.	Eâdem facie	

(2) Nouns which have their stems in *i* might form the ablative in *i*, but such is the case only—1. With those which make the accusative in *im*. 2. With the neuter nouns in *e*, *al*, and *ar*. 3. With all adjectives in *-is*, *-is*, *-e*, and *-er -is -e*; as, *amussi, ravi, siti*; *mari, vectigali, calcari*; *miti, acri.*

(3)

	Future Indic. Act.		Imperfect Subj. Passive.	
	SING.	PLUR.	SING.	PLUR.
1.	Regam	regemus	Audirer	audiremur
2.	Reges	regetis	Audireris	audiremini
3.	Reget	regent	Audiretur	audirentur

ENGLISH.

Amandus—to be loved, deserving or requiring to be loved.
Docturus—being about to be taught.
Rectum iri—to be about to be ruled.
Auditu—to be heard.

TRANSLATION.

(4) (*a*) Romulus calls the city 'Rome.'
(*b*) My friend lives in that house, which thy brother built.

PARSING.

Urbem—acc., sing., fem., noun, 3rd decl., 'urbs -is' gov. by 'vocat.'

vocat—reg., trans. verb, 1st conj., act., indic., pres., 3rd pers., sing., agr. with 'Romulus' (*voco -avi -atum -are.*)

ea—abl., sing., fem., demonst. adj. *is*, *ea*, *id*, qual. 'domo.'

domo—abl., sing., fem., noun, partly 4th and partly 2nd decl., *domus*, *domûs* (*domi* is a locative, meaning 'at home').

quam—acc., sing,, fem., anteced. 'domo,' rel. pron. *qui*, *quae*, *quod*, gov. by 'œdificavit.'

ædificavit—reg., trans. verb, 1st conj., *ædifico -avi -atum are*, indic., pret., 3rd pers., sing., agr. with 'frater.'

END OF SECOND YEAR.

FIRST PAPER.

Two hours and a half allowed for this Paper.

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write, in large hand, as a specimen of copy-setting, the word 'Acknowledgment.'

Write in small hand, as a specimen of copy-setting, the sentence 'Kind hearts are more than coronets.'

Arithmetic.

MALES.

1. For what time was £312 10s. invested in $2\frac{3}{4}$ per cent. when it amounted to £331 8s. $1\frac{1}{2}$d. ?

$$\left.\begin{array}{ccc}\text{£}312\text{ 10s.} & : & \text{£}100\\ \text{or} & & \text{or}\\ 6250\text{s.} & : & 2000\text{s.}\\ \text{£}2\text{ 15s.} & : & \text{£}181\text{ 8s. }1\tfrac{1}{2}\text{d.}\\ \text{or} & & \text{or}\\ 1320\text{ halfd.} & : & 9075\text{ halfd.}\end{array}\right\} :: 1\text{ yr.} : \text{time.}$$

$$\frac{1\text{ yr.}\times 2000\times 9075}{6250\times 1320} = \underline{2\tfrac{1}{5}\text{ yrs.}}\quad\text{Ans.}$$

2. £2,350 was invested in the Three-and-a-Half per Cents. at 94; by-and-bye the price fell to 90, and then I sold out and bought house property which yielded me my original income; what per centage did I get from the property ?

(*a*) £94 : £2350 :: £$3\frac{1}{2}$: 1st income.

$$\frac{\text{£}7\times 2350}{2\times 94} = \text{£}87\text{ 10s.}$$

(*b*) 94 : 90 :: £2350 : sum realised.

$$\frac{\text{£}2350\times 90}{94} = \text{£}2{,}250.$$

(*c*) £2,250 : £100 :: £87·5 : per centage from property.

$$\frac{\text{£}87{\cdot}5\times 100}{2250} = \underline{3\tfrac{8}{9}}.\quad\text{Ans.}$$

3. A cargo of coals, weighing 96 tons, and sold for £42 11s., realised a profit at the rate of $6\frac{3}{8}$ per cent.; find the prime cost.

£$106\frac{3}{8}$: £100 :: £42 11s. : prime cost.

$$\frac{\text{£}42\text{ 11s.}\times 100\times 8}{851} = \frac{851\text{s.}\times 800}{851}$$

$$= 800\text{s.} = \underline{\text{£}40}.\quad\text{Ans.}$$

FEMALES.

1. Find the value of $(\frac{3}{5}$ of $4\frac{1}{6}+\frac{1}{5})$ of 5 fur. 20 po., and $(\frac{3}{5}$ of $2\frac{3}{4})$ of £3 0s. 6d.

(*a*) $(\frac{3}{5}$ of $4\frac{1}{6}+\frac{1}{5})$ of 5 fur. 20 po. $= \left(\dfrac{3\times 25}{5\times 6}+\dfrac{1}{5}\right)$ of 220 po.

$= (2\frac{5}{10}+\frac{2}{10})$ of 220 po.
$= \frac{27}{10}$ of 220 po.
$= 594$ po. $=$
$\underline{1\text{ m. }6\text{ fur. }34\text{ po.}}$ Ans.

(*b*) $(\frac{3}{5}$ of $2\frac{3}{4})$ of £3 0s. 6d. $= \dfrac{3\times 11}{5\times 4}$ of $60\frac{1}{2}$s.

$$= \frac{121\text{s.}\times 33}{2\times 20}$$

$$= \frac{3993\text{s.}}{40} = \underline{\text{£}4\text{ 19s. }9\tfrac{9}{10}\text{d.}}\quad\text{Ans.}$$

2. Reduce to decimals $\frac{3}{5}$, $\frac{10}{15}$, $\frac{6}{70}$, $\frac{4}{1000}$ and $\frac{134}{9000}$.

$$\tfrac{3}{5} = \frac{3{\cdot}0}{5} = \underline{{\cdot}6.}\quad\text{Ans.}$$

$$\tfrac{10}{15} = \frac{2{\cdot}0}{3} = \underline{{\cdot}\dot{6}.}\quad\text{Ans.}$$

$$\tfrac{6}{70} = \frac{{\cdot}6}{7} = \underline{{\cdot}0\dot{8}5714\dot{2}.}\quad\text{Ans.}$$

$$\tfrac{4}{1000} = \underline{{\cdot}004.}\quad\text{Ans.}$$

$$\tfrac{134}{9000} = \frac{{\cdot}134}{9} = \underline{{\cdot}014\dot{8}.}\quad\text{Ans.}$$

3. How many revolutions should a wheel $1\frac{5}{6}$ in. in circumference make in a journey of half a mile ?

Half a mile = 2640 ft. = 31680 in.

$$\text{Revolutions} = 31680 \div 1\tfrac{5}{6}\text{ in.} = \frac{31680\times 6}{11}$$

$$\text{,,}\qquad = \frac{190080}{11} = \underline{17280.}\quad\text{Ans.}$$

4. Divide sixty shillings among 19 boys and 13 girls so that a boy may have one-third more than a girl.

13 girls get 13 shares
19 boys get $\underline{25\frac{1}{3}}$,,
Total shares = $38\frac{1}{3}$

$$\therefore\ \text{A girl's share} = \frac{60\text{s.}}{38\frac{1}{3}} = \frac{180\text{s.}}{115} = \underline{1\text{s. }6\tfrac{18}{23}\text{d.}}\quad\text{Ans.}$$

$$\text{and a boy's} = 1\text{s. }6\tfrac{18}{23}\text{d.}\times 1\tfrac{1}{3} = \underline{2\text{s. }1\tfrac{1}{23}\text{d.}}\quad\text{Ans.}$$

Euclid.

(Book-work well done will get the mark 'G.')

1. Define *point*, *straight line*, and *superficies*.

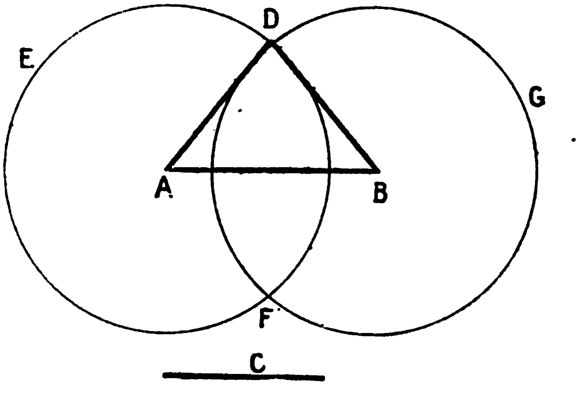
A *point* has position but not magnitude.

A *straight line* is that which lies evenly between its extreme points; or a *straight line* is the shortest distance between two points.

A *superficies* or surface is that which has length and breadth.

2. To describe a parallelogram equal to a given rectilineal figure, and having an angle equal to a given rectilineal angle. Euclid, Bk. I., Prop. 45.

3. On a given line describe an isosceles triangle with sides equal to a given straight line. What is the condition implied ?



Let AB be the given base and C the straight line, to which the sides are to be equal. [*The condition implied is that C must be greater than half the base.* (I. 20.).]

From the centre A. with a radius equal to C, describe the circle DEF, and from the centre B, with the same radius, describe the circle DGF.

Then from the point D, where the circles cut one another (for they will cut one another because the radius of each is greater than half the line AB), draw DA, DB to the points A and B, the extremities of the given base.

Now because A is the centre of the circle DEF, whose radius is equal to C, then AD is equal to C. For the same reason BD is equal to C. Wherefore an isosceles triangle ADB has been constructed on the given base AB, and with sides equal to C.

Q.E.F.

Grammar.

'Of Nelson and the North
Sing the glorious day's renown,
When to battle *fierce* came forth
All the *might* of Denmark's crown,
And her arms along the *deep* proudly shone;
By each gun the lighted *brand*
In a bold determined hand,
And the Prince of all the land
Led them *on*.'

1. Give a general analysis of the above passage.
2. Parse fully the words printed in italics.

GENERAL ANALYSIS.

A. Of Nelson and the North sing the glorious day's renown. (*Principal sentence*).

a 1. When to battle fierce came forth all the might of Denmark's crown. (Subord. adj. sent. of time to A.)

a 2. (and) (when) her arms along the deep proudly shone. (Subord. adj. sent. of time to A.)

B. By each gun (was) a lighted brand in a bold determined hand. (Principal sent.)

C. (and) the Prince of all the land led them on. (*Principal sent. in copulative co.-ord. with B.*)

PARSING.

Sing—irreg. trans. verb, *sing, sang, sung*, imper., pres., 2nd pers., subj. understood.
fierce—adj. qual. 'battle.' (It might be adv. too, mod. 'came').
might—abstr. noun, neut., sing., nom., subj. of 'came').
deep—abstr. noun, neut., sing., obj., gov. by 'along.'
brand—com. noun, neut., sing., nom., subj. of 'was.'
on—adv. of manner, mod. 'led,'

3. Give examples to illustrate (*a*) the omission of the antecedent (*b*) the omission of the relative pronoun.

(*a*) 1. Who steals my purse steals trash.
2. You may tell whom you will.
3. How shall I curse whom God hath not cursed?

(*b*) 1. I know the tale you told.
2. Æneas left Troy the very night it was taken.
3. In this 'tis God directs, in that 'tis man.

SECOND PAPER.

(*Two hours and a half allowed for this paper.*)

Geography.

1. Draw a map of the Baltic, naming the gulfs, river mouths, and islands.

2. State as fully as you can the exact position of the following, and add anything you know about each:—Palermo, Odessa, Lahore, Elsinore, Benares, Sophia, Delhi.

Palermo is situated on the N. coast of Sicily, and has one of the finest climates in Europe. It is a seaport, and was the scene of a dreadful massacre call the 'Sicilian Vespers' six hundred years ago.

Odessa is a city and seaport of Russia, on the Black Sea, between the rivers Dniester and Bug. It has a great export trade in grain.

Lahore, the capital of the Punjaub, near the left bank of the Ravee, on the highway from Delhi to Kabul. It contains many temples and magnificent buildings.

Elsinore is a seaport of Denmark, on the island of Zealand, to the north of Copenhagen, on the narrowest part of the Sound. Vessels used to pay toll to the King of Denmark in order to pass this place.

Benares is a famous city of British India, capital of a division of the same name, and stands on the north bank of the Ganges. It is the chief seat of Brahminical learning.

Sophia, on the Isker, in Bulgaria, manufactures woollen and silk goods, leather and tobacco, and has considerable trade.

Delhi, the chief city of the division of the same name, and long capital of the Mogul Empire, stands on the Jumna. It is very strongly fortified, has an excellent college, and in 1857 it was taken by the British from the insurgent sepoys, by whom it had been seized in the beginning of that year.

3. How would you explain this sentence to a class?—The ship was last spoken in lat. 20° S., long. 10° W.

Taking a terrestial globe, or a map of the world, I would explain terms latitude and longitude. The former being a name denoting the distance of a place counted in degrees, minutes. and seconds, north or south of the Equator, the latter a name denoting similarly the distance of a place east or west of the first meridian which for this country passes through Greenwich Observatory. After ensuring myself that the class has got a clear idea of these, I would find a point on the Equator 10° west of Greenwich, and, running along the line southwards, stop at the parallel of latitude 20° from the Equator, and show that the point where these lines meet is the very spot required.

History.

(*Answer any two of the following questions.*)

1. State the claims of William the Conqueror to the throne of England; and tell what you know of the Feudal System he instituted, and of the Saxon land tenure it displaced. Explain the terms Domesday Book and Curfew Bell.

William the Conqueror founded his claim to the throne of England on the purpose, if not the testament of, Edward the Confessor, and on the oath which Harold had made to promote the Duke's succession to it. The Feudal System was the tenure of land by military service. All lands belonged in the first instance to the King, and were by him apportioned to his vassals, and in turn let by them to sub-vassals or retainers. This system, though in vogue in Saxon times, was the distinctive feature of the Norman period. The feudal tenure of lands still exists, in theory at least, all land in England being held directly or indirectly from the Crown. *Folkland* was the land of the folc, or people, in Saxon England. The Folcland was that portion of the kingdom which was retained in behalf of the public, and with a view to increasing population, and the growing wants of the community—was not permitted to become allodial estate or absolute private property. The holder of folcland paid rent for his lands, and could be dispossessed at will.

Domesday Book is the record of a survey made by William the Conqueror. It consists of two volumes, and contains the names of every town and village, the names of estates, their value, size, owners, and other information.

Curfew Bell was a bell tolled in Norman England as a signal to extinguish all fires and lights.

2. State the names of the various Scottish sovereigns that suffered imprisonment in England during the period 1066—1603, with the circumstances, places, and dates of imprisonment.

William the Lion, who had supported the sons of Henry II. of England in their rebellion against their father, was taken prisoner at Alnwick Castle, 1174, and regained his liberty only on condition of becoming liegeman of Henry for his territories.

At Nevil's Cross, 1346, Philippa defeated and took prisoner David II. of Scotland, who was committed to the Tower after being led through the streets of London. He was detained a prisoner for eleven years.

James I. of Scotland was taken prisoner off Flamborough Head by an English ship, as he was being conveyed to France (1406). He was kept a prisoner in London for eighteen years, but received an excellent education.

When Mary Queen of Scots took refuge in England (1568) Elizabeth detained her a prisoner, and she was ordered from castle to castle, till, finally confined in Fotheringay, she was beheaded there in 1587, after an imprisonment of eighteen years.

3. State what you know of Simnel and Warbeck.

In the reign of Henry VII. a youth appeared, asserting himself to be the Earl of Warwick, son of George, Duke of Clarence. He was crowned king in Ireland, but on landing in England his little army was overthrown at Stoke-upon-Trent, 1487. The pretended earl, who was one Lambert Simnel, son of an Oxford joiner, was captured and treated with contemptuous mercy, Henry making him scullion in his kitchen.

Perkin Warbeck claimed the throne in the same reign, as being the duke of York who was said to have been murdered in the tower with Edward V. by their uncle Richard. He invaded England and besieged Exeter, but his army being dispersed he took refuge in Beaulieu Abbey. Being drawn from it by a promise of pardon he was executed as a traitor, 1499.

4. Give some account of Henry Eighth's attack on the monasteries.

After the fall of Wolsey his power was conferred upon Thomas Cromwell, who became Henry's Vicegerent in ecclesiastical matters, and as during his administration all the monastic foundations were destroyed, he has been called 'The Hammer of the Monks.'

In 1536 an Act of Parliament dissolved the smaller monasteries and their revenues were given to the king. The north-country people broke out in a revolt called the 'Pilgrimage of Grace' which was easily quelled; and then followed the destruction of the larger houses. Abbots and priors were made to surrender them as of free will to the king, and an Act was passed, 1539, confirming these and future surrenders. Of the vast wealth thus thrown into Henry's hands, part went to found new bishoprics, and part to fortify the coast, but most went in lavish grants to courtiers, whilst many abbeys were pulled down for the sake of their stone and lead.

Composition.

Write notes of a lesson on 'Fuel' or 'Birds' Nests.'

FUEL.

Things to be seen.—Fuel, pieces of wood, charcoal, peat, coal, patent fuel, coke.

Definition.—Fuel consists of such combustibles commonly used for fires or furnaces, such as coal, wood, turf, &c., which differ in value according to their power of giving out heat.

Kinds of Fuel.—Wood—originally used by man; best known to him in early stages of civilization; different kinds give out heat according to dryness and weight. Newly felled wood contains large quantities of sap and moisture, therefore less valuable for fuel than dry well-seasoned wood. *Charcoal* (*manufacture to be described*)—used where smoke cannot be tolerated; dangerous to health (*why*). *Peat*—remains of dead plants (*describe bog and method of cutting and drying peat*), sometimes called 'turf.' Turf, properly, upper layer of a field containing roots of living plants; peat does not give so much heat as the same weight of coal. *Coal*—Advert to coal fire; question on coal-mining; coal-field; collier; immense coal wealth of England; coal the most commonly used fuel of civilized countries when obtainable; heating power greater than charcoal. *Patent Fuels*—made from coal-dross mixed with tar, pitch, sawdust, &c.; made in great quantities in Scotland by Messrs. Wm. Baird and Coy.; called briquettes; very handy for all kinds of fires. *Gas*—Often takes the place of fuel.

Latin.

1. Go through the present indicative and subjunctive of *prosum*, *nolo*, and *malo*.

2. Give the participles of *eo*, and the imperatives and infinitives of *fio* and *nolo*.

3. Distinguish the use of *nostrum* and *nostri*, and express in Latin: the one, the other, some, others, the former, the latter.

4. Translate, parsing, with syntax, the words in italics:—
   (*a.*) Amicum *fallere turpissimum* est.
   (*b.*) Non idoneus fuit, *qui exercitui præesset.*

5. Translate into Latin:—
   (*a.*) We know that Hannibal was conquered by Scipio.
   (*b.*) He arrived before the ambassadors departed.

	PRESENT INDICATIVE		PRESENT SUBJUNCTIVE	
	Sing.	*Plural*	*Sing.*	*Plural*
1.	prosum	prosumus	prosim	prosimus
2.	prodes	prodestis	prosis	prositis
3.	prodest	prosunt	prosit	prosint
1.	nolo	nolumus	nolim	nolimus
2.	nonvis	nonvultus	nolis	nolitis
3.	nonvult	nolunt	nolit	nolint
1.	malo	malumus	malim	malimus
2.	mavultis	mavultis	malis	malitis
3.	mavult	malunt	malit	malint

2. Participles of *eo*—Pres., iens, euntis. Fut., iturus-a-um.
Infinitives—Pres., fieri. Fut., factum iri. Perf., factum iri.
„ nolle. —— „ noluisse.

3. (*a*) *Nostrum* is used only in a partitive sense, as *multi nostrum*, many of us; whereas *nostri* is the regular genitive, as *memor est nostri*, he is mindful of us.

(*b*) The one, *alter*; some, alii; the other, alter; others, alii the former, ille prior; the latter, hic posterior.

4. Translation into English:—
(*a*) To deceive a friend is very mean.
(*b*) There was not a fit man to command the army.

PARSING.

Fallere—irreg. trans. verb, act., *fallo, fefelli, falsum, fallere*, 3rd. conj., inf., pres., here gerundial.

turpissimum—adj., 1st. and 2nd. conj., *turpissimus-a-um*, superl. deg. of turpis-ior-issimus, neut., nom., predic. of 'fallere amicum.'

qui—rel. pron., *qui, quae, quod*, anteced. 'idoneus,' nom., mas., subj. of 'prœesset.'

exercitui—com. noun, mas., 4th decl., *exercitus-ûs*, sing., dat., gov. by 'prœesset.'

prœesset—irreg. verb, *præsum-fui-esse*, subj., imperf., 3rd pers., sing., agr. with 'qui.'

5. Translation into Latin:—
(*a*) Scimus Hannibalem a Scipione victum esse.
(*b*) Advenit priusquam legati discesserant.

Teaching.

1. What faults in reading are common among young scholars, and how would you correct them?

2. State the proper way of holding the pen in writing. What is this intended to secure? Why should the use of short pencils be avoided?

1. The faults in reading, common among young scholars, are errors of pronunciation affecting the sounds of single words, neglecting the phrases, and shouting, or its opposite. Errors in pronunciation should be corrected at once, and the attention of the whole class called to the errors made, the young reader being interrupted for the purpose. This mode should be employed till the class is able to read easy narrative freely. Bad phrasing begins with narrative reading and this can only be avoided by pattern on the teacher's part, and showing how words are grouped together in meaning. Shouting may be toned down by pattern giving, requesting the pupil to read as he speaks; and reading in too low a voice may be cured by the teacher standing well back from the class, and encouraging the little one to speak well out, so as to be heard at a good distance.

2. The pen should be held between the thumb (bent) and the first two fingers; the first finger on the pen, and the edge of the middle finger just supporting and keeping the pen in position. The pen must be kept in a sloping position, passing between the second joint and knuckle of the first finger, and pointing up towards the right ear.

This secures a less laborious style of writing, great facility in using the pen, and is less fatiguing than other methods.

Short Pencils should be avoided as teaching a bad style of holding the pen; the pupil being forced to hold these short pencils only between the thumb and forefinger, so that when he comes to write with a pen he naturally thinks that he should follow up his usual style.

END OF THIRD YEAR.

FIRST PAPER.

(*Two hours and a half allowed.*)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write, in large hand, as a specimen of copy-setting, the word 'Acknowledgment.'

Write, in small hand, as a specimen of copy-setting, the sentence 'Kind hearts are more than coronets.'

Arithmetic.

MALES.

(*Solve* any two *of the following questions.*)

1. What is the average attendance in each of the two following schools:—(*a*) a school of 1,230 pupils and $12\frac{1}{2}$ per cent. absent; (*b*) a school of 560 pupils with a daily average of 69 absentees? Calculate the percentage of absenteeism in the latter.

(*a*) $100 : 87\frac{1}{2} :: 1230$ pupils : aver. att.

$$\frac{1230 \text{ pupils} \times 87\frac{1}{2}}{100} = \underline{1076{\cdot}25} \text{ pupils. Ans.}$$

(*b*) (1) 560—69 = $\underline{491}$ daily average. Ans.

(2) $560 : 69 :: 100$: percentage of absentees.

$$\frac{100 \times 69}{560} = \frac{6900}{560} = \underline{12\tfrac{9}{28}} \text{ Ans.}$$

2. How much must I invest in the $3\frac{1}{2}$ per cents. at $99\frac{3}{4}$ to realise an income of £350 a year?

$3\frac{1}{2} : 350 :: £99\frac{3}{4}$: sum required.

$$\frac{£99\frac{3}{4} \times 350}{3\frac{1}{2}} = \frac{399 \times 350}{14} = \underline{£9975.} \text{ Ans.}$$

3. Find the square root of 34850.

$$\begin{array}{r|l} & 3,48,50(\underline{186{\cdot}41}. \text{ Ans.} \\ 1 \times 1 = & 1 \\ \hline & 248 \\ 28 \times 8 = & 224 \\ \hline & 2450 \\ 366 \times 6 = & 2196 \\ \hline & 15400 \\ 3724 \times 4 = & 14896 \\ \hline & 50400 \\ 37241 \times 1 = & 37241 \end{array}$$

FEMALES.

1. Add by decimals $\frac{3}{1000}$, $\frac{4}{5}$, $6\frac{2}{27}$, $\frac{2}{7}$, $3\frac{7}{45}$, and 23.

$$\begin{array}{rcr|r|l} \frac{3}{1000} & = & {\cdot}003 & & \\ \frac{4}{5} & = & {\cdot}8 & & \\ 6\frac{2}{27} & = & 6{\cdot}\dot{0}74 & 074074 & 0 \\ \frac{2}{7} & = & {\cdot}\dot{2}85 & 714285 & 7 \\ 3\frac{7}{45} & = & 3{\cdot}1\dot{5}5 & 555555 & 5 \\ & & 23{\cdot} & & \\ \hline & & \underline{33{\cdot}318} & \underline{34391\dot{5}} & \end{array}$$

2. £1875·825 was the price paid for $\frac{3}{10}$ share of a farm; by-and bye, when the value of the whole farm had fallen by £1440, what should be paid for ·$\dot{7}$ of it?

(2) (*a*) Value of the whole farm $= £1875{\cdot}825 \times \frac{10}{3}$,
$= £6252{\cdot}75$.

(*b*) Price of ·$\dot{7}$ when the value has fallen by £1440 =

$$£6252{\cdot}75 - £1440 \times \tfrac{7}{9} = \frac{£4812{\cdot}75 \times 7}{9}$$
$$= \frac{£33689{\cdot}25}{9}$$
$$= \underline{£3743\ 5\text{s.}} \text{ Ans.}$$

3. If building ground be bought for 15s. 9d. per square yard, what will be the cost of half an acre?

Half an acre = 2420 sq. yds.

	£	s.		
	2420	0	=	value at £1.
10s. = ½ of £1	1210	0	=	„ „ 10s.
5s. = ½ of 10s.	605	0	=	„ „ 5s.
6d. = $\frac{1}{10}$ of 5s.	60	10	=	„ „ 6d.
3d. = ½ of 6d.	30	5	=	„ „ 3d.
	£1905	15	=	„ „ 15s. 9d. **Ans.**

4. A bankrupt's debts are £1290; he pays one dividend, 10s. 8d. in the £, and by-and-bye another, at the rate of 7s. 6d. in the £, of what he is *still owing*; find the loss per £ to the creditors.

(*a*) By paying 10s. 8d. in the £ he still owes 9s. 4d. in the £.

(*b*) By paying 7s. 6d. in the £ he pays $\frac{90}{112}$ or $\frac{5}{8}$ of the 9s. 4d. still owing in the £.

(*c*) $\frac{3}{8}$ of 9s. 4d. = 3s. 6d.; he therefore owes (9s. 4d. — 3s. 6d.), or $\underline{\text{5s. 10d.}}$ is the loss to the creditors.

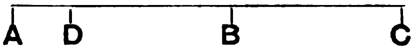
Euclid.

(*Book work well done will get the mark* '*G.*')

1. If a straight line be bisected, and produced to any point, the square on the whole line thus produced, and the square on the part of it produced, are together double of the square on half the line bisected and of the square on the line made up of the half and the part produced.

Euclid, Book II. Prop. 10.

2. Divide a given straight line into two parts, such that the squares of the whole line and one of the parts shall be equal to twice the square of the other part.



Let AB be the given line. Produce AB to C, making AC so that the square upon it shall be equal to three times the square upon AB. From BA cut off BD equal to BC, then the squares upon AB and BD shall be double of the square upon BD. (*We may say that CD is bisected in B, and produced to A.*)

∴ (II. 10) the squares upon AC and AD are equal to twice the square upon BD and twice the square upon AB. But the square upon AC = three times the square upon AB. ∴ three times the square upon AB, together with the square upon AD, are equal to twice the square upon AB and twice the square upon BD. Take away twice the square upon AB from each of these equals, and the square upon AB, together with the square upon AD, is equal to twice the square upon BD. Therefore AB is divided in D, so that the squares, &c. Q.E.F.

Algebra.

(*Solve* any three *of the following questions.*)

1. State the rule for finding the G.C.M. of two algebraical quantities, and find the G.C.M. of

$$2x^4 - 7x^3 + 12x^2 - 11x + 3 \text{ and } x^5 - x^3 + 5x^2 - 2x.$$

Let A and B represent the two expressions; arrange them according to descending powers of some common letter, and suppose the index of the highest power of that letter in A not less than the highest power of that letter in B. Divide A by B; then make the remainder a divisor and B the dividend. Again make the new remainder the divisor and the preceding divisor the dividend. Proceed in this way till there is no remainder; then the last divisor is the G.C.M.

$$\begin{array}{r} 2x^4 - 7x^3 + 12x^2 - 11x + 3)\ x^5 - x^3 + 5x^2 - 2x \\ 2 \\ \hline 2x^5 \qquad - 2x^3 + 10x^2 - 4x \\ 2x^5 - 7x^4 + 12x^3 - 11x^2 + 3x \\ \hline 7x)\ 7x^4 - 14x^3 + 21x^2 - 7x \\ \hline x^3 - 2x^2 + 3x - 1 \end{array}$$

$$\begin{array}{r} x^3 - 2x^2 + 3x - 1)2x^4 - 7x^3 + 12x^2 - 11x + 3(2x - 3 \\ 2x^4 - 4x^3 + 6x^2 - 2x \qquad\quad \\ \hline - 3x^3 + 6x^2 - 9x + 3 \qquad \\ - 3x^3 + 6x^2 - 9x + 3 \qquad \\ \hline \end{array}$$

$$\therefore \underline{x^3 - 2x^2 + 3x - 1} = \text{G.C.M.}$$

2. Find x from the following equation :—

$$a(x-b)(x-c)-b(x-a)(x-c)-(a-b)(x-a)(x-b)=0$$

$$a(x-b)(x-c)-b(x-a)(x-c)-(a-b)(x-a)(x-b)=0$$

$$ax^2-abx-acx+abc-bx^2+abx+bcx-abc-ax^2+bx^2+a^2x-abx+abx-b^2x-a^2b+ab^2=0$$

After collecting, $acx+bcx+a^2x-b^2x-a^2b+ab^2=0$

Transposing, $a^2x-acx+bcx-b^2x=a^2b-ab^2$

$$x(a^2-ac+bc-b^2)=ab(a-b)$$

$$x(a+b-c)=ab$$

$$x=\underline{\frac{ab}{a+b-c}}\quad\text{Ans.}$$

3. A ship's crew have provisions for 100 days. They pick up a shipwrecked crew of 20 men, in consequence of which the provisions will last for only 60 days. What was the crew?

Let x = number of crew

Then $x : x + 20 :: 60 : 100$

Or $100x = 60x + 1200$

$100x - 60x = 1200$

$40x = 1200$

$x = \underline{30}$ number of crew. Ans.

4. Find the area of an isosceles triangle of which each of the equal sides is 7 ft. 1 in. and the base 6 ft.

Perp. height $= \sqrt{85^2 \text{ in.} - 36^2 \text{ in.}}$

" " $= \sqrt{7225 - 1296}$

" " $= \sqrt{5929}$

" " $= 77 \text{ in.} = 6\frac{5}{12}$

Area $= \dfrac{6 \text{ ft.} \times 6\frac{5}{12}}{2} = \underline{10\frac{1}{4}}$ sq. ft. Ans.

Grammar.

Spur on thy *way!*—*since* now *thine* ear
Has brook'd thy veterans' wish to hear,
Who, as thy flight they eyed,
Exclaim'd,—while tears of anguish came,
Wrung forth by pride, and rage, and shame,—
'*O*, that he had *but* died!'

1. Give a general analysis of the above passage.

2. Parse the words in *italics*.

ANALYSIS.

A. 'Spur on thy way.'—*Principal sentence.*

a_1. 'Since now thine ear has brooked thy veterans' wish to hear.'—*Subord. adv. clause. to A.*

a_2. 'Who exclaimed, "O, that he had but died."'—*Subord. adj. sent to* a_1.

a_3. 'While tears of anguish came, wrung forth by pride, and rage, and shame.'—*Subord. adv. sent. to* a_2.

a_4. 'O, that he had but died.'—*Subord. noun sent. to* a_2.

PARSING.

Spur—Reg., intran., verb. imper., pres. 2nd pers. agr. with (thou).

on—Prep., relating 'spur' and 'way.'

way—Com. noun, neut., sing., obj., gov. by 'on.'

since—Subord. conj. of condition, introd., subord. adv. sent.

thine—(=thy) pronoun, poss., adj., qual. 'ear.'

wrung—Complete part of irreg. trans. verb, *wring, wrung, wrung*, qual. 'tears.'

forth—Adv.. 'motion from' mod. 'wrung.'

O—interjection, 'grief.'

but—Adv., mod., 'died.'

3. What is an Interjection? Do Interjections govern cases? if so, give examples.

An interjection is a word which expresses any sudden wish or emotion of the mind, but it does not express a definite idea.

Interjections can scarcely be said to govern a case, but some of them are followed by an object; as, Ah me! Oh dear me! but this occurs only with the first person.

4. What Latin prefixes occur in the following words :—*ambiguous, effect, oppose, redeem, uniform*? Give their meaning.

WORD	PREFIX	MEANING
ambiguous	ambi = ambo	both
effect	ef = ex	out of
oppose	op = ob	against
redeem	red = re	again
uniform	uni = unus	one

SECOND PAPER.

(*Two hours and a half allowed for this paper.*)

Geography.

1. Draw a map of the north coast of Africa and of the countries bordering on it. Show the physical features.

2. Describe the physical features and name the productions of Cape Colony.

(2) In the southern and more populous part of the colony the rise from the coast to the interior takes place in well marked terraces, the edges of which, facing seawards, present the appearance of mountains on the outside. The innermost terrace is bounded on the south by a true mountain range with peaks of from 5,000 to 6,000 feet in height, but the table-lands on either side are 3,000 feet in height or more. These table-lands are called Karroos, and that which lies to the south of the mountain range just mentioned is in most parts at least seventy miles in breadth, and is known as the Great Karroo. The general slope of the Karroos is towards the interior, but outside of the inner mountain range the rivers nevertheless all flow directly seawards, and break through the edges of the table-lands in deep gorges called Kloofs.

The chief productions are wool, diamonds, ostrich-feathers, wine, copper, gold, and heaths.

3. Give the situation of the following places :—Tunis, Lake Ngami, Muscat, Khiva, Lake Baikal, Bangkok, Nankin, Sierra Leone.

Tunis is in North Africa on the west side of a lagoon, and within ten miles of ancient Carthage.

Lake Ngami is in the basin of the Zambesi north of the Kalihari Desert in South Africa.

Muscat is situated in the east corner of Arabia near the entrance of the Persian Gulf.

Khiva is in Western Turkestan near the Oxus.

Lake Baikal lies in Eastern Siberia on the River Lena.

Bangkok stands on the Menam in Siam.

Nankin stands on the Yang-tse-kiang in China and communicates with Pekin by means of the Grand Canal.

Sierra Leone in West Africa is watered by the Rokelle or Sierra Leone River.

History.

(Answer *any two* of the following questions.)

1. Describe the Porteous Riots.

The Porteous Riots took place in 1736. A mob in Edinburgh, roused to madness by the execution of a smuggler named Wilson who had magnanimously assisted a fellow prisoner to escape, attacked the hangman and the soldiers. Captain Porteous, of the City Guard, ordered his men to fire upon the crowd and several people were killed. For this rash act he was condemned to death, but a reprieve was obtained, and it was immediately reported that a pardon would follow. The rioters, not to be baulked of their prey, broke open the jail and hanged the captain on a dyer's pole. The government, enraged at this, brought in a bill to demolish the walls of Edinburgh and take away the charter of the city, but so strongly was the measure opposed by the Scottish members that it had to be abandoned.

2. What do you know of the attempts of the first two Stuarts to establish Episcopacy in Scotland?

In 1617, when on a visit to Scotland, James I. tried to make the Church of Scotland less different from the Church of England. For this purpose he proclaimed that public worship should be held on Christmas Day, Good Friday, Easter, Ascension Day, and Whitsunday; and in a General Assembly, held at Perth (1618), he got what are known as the *Five Articles of Perth* passed, all with the same end in view. This was greatly against the wishes of the Scotch, and James prudently took care not to go too far.

In 1633 Charles visited Scotland and was crowned at Holyrood. It was soon seen that the English form of religion was to be forced on Scotland with more determination than ever, especially when Laud became Archbishop. A prayer-book was at this time in use in Scotland, and in 1637 an attempt was made to do away with it, and to impose, instead, a prayer-book prepared by Laud, similar to that of the Church of England. The introduction of the new book was fiercely opposed. When it was first used in Edinburgh a riot took place in St. Giles's Church, and stools were flung at the clergyman, a certain woman, *Jenny Geddes*, being, it is said, the first to throw. In order the better to resist attempts against the religion of Scotland, a body known as *The Tables* was elected by those opposed to the innovations. The body consisted of sixteen men, elected four each by the greater nobles, the lesser nobles, the burgesses, and the clergy. Under its leadership the Scotch banded themselves together, and the document known as the *National Covenant* was drawn up and signed by all ranks. By this document persons bound themselves to resist all changes in religion, and to join together for mutual defence. A great assembly of the Church met in Glasgow and abolished the office of Bishop. In 1639 Charles proceeded against Scotland with an army. The Covenanters, as they came to be called, under General Leslie, marched to meet him, but when the two armies came in sight of each other a temporary peace was concluded, without any fighting.

3. Narrate the military operations in the Crimean War, with dates.

In 1854, an army of 51,000 men, under Marshal St. Arnaud and Lord Raglan, landed at Eupatoria in September. As they marched along the shore of the Crimea they discovered 50,000 Russians lining the slopes on the banks of the Alma. In three hours the passage of the river was forced, and the enemy fell back on Sebastopol. The French and English took up a position to the south of the town. In October the bombardment of Sebastopol began; but the fortifications were found to be almost impregnable. A Russian attack on the British base at *Balaklava* was repulsed, and here occurred the brilliant, though useless, *charge of the Light Brigade*. Near *Inkerman*, in the same year, November 5, the Russians attacked the British position in the grey morning, and though surprised and outnumbered, the British soldiers and officers, fighting side by side, held their own till, aided by the French, they forced the enemy to retreat, leaving an immense number of dead. During the winter the troops suffered severely, but under Lord Palmerston's' Government a better management took place. In the beginning of 1855 the Czar Nicholas died, and Sardinia having joined the Anglo-French alliance, her troops, along with the French, gained a brilliant victory on the banks of the *Tchernaya*. In September the French took the *Malakoff Tower*, and a British forlorn-hope managed to seize the *Redan*, but the enemy's guns forced them to retire with heavy loss. During the next night the Russian leader led off the garrison to the northern part of the town, which they ultimately left, after sinking their ships. The bombardment of *Sveaborg* and the defence of *Kars* are the only other important events outside of the Crimea.

Composition.

Write a letter on 'A Railway Station' *or* 'Winter Amusements.'

Glasgow, 30th April, 1888.

My dear nephew,

It may afford you some amusement, if not information, to read a description of a railway station, and that one the famed St. Enoch's belonging to our own city.

As we approach the entrance up the slope in front of the hotel we have no idea of the great business going on inside. Entering one of the doorways we find a crowd round the little pigeon holes waiting for their tickets, and when got, each traveller is seen rushing off to take his seat. The arrangements for ticket-selling are all for ease to the clerks, whatever travellers may find. Emerging from the hall we find ourselves on a spacious pavement under a huge over-arching roof of ornamental iron-work. As we stand for a moment we see every facility for supplying human needs—refreshments for the hungry or thirsty, literary food for the student, or amusing matter for a pastime; telegraph office for a message to warn our friends; a hotel door open for the reception of wearied travellers; offices to guard luggage that may for the present be only an encumbrance, and, I declare, a barber's shop where, on stepping from the train, your beard may be shaved, your hair cut, and your face washed if you can't get a bath to destroy all traces of travel. Then at night how strange and grand it is to watch the mixed multitude running here and there, followed by an immense shadow—almost a second self—cast by the weird light of the electric lamps! The student of human nature cannot find a much finer place for indulging his fancies than St. Enoch's Station, Glasgow.

I am,
Your loving uncle,
JOHN SMITH.

Latin.

1. Translate :—

(*a*) Gallis magno ad pugnam erat impedimento, quod pluribus eorum scutis uno ictu pilorum *transfixis* et colligatis, cum ferrum se inflexisset, neque evelere neque sinistra impedita satis commode pugnare poterant, multi ut diu iactato brachio prœoptarent scutum manu emittere et nudo corpore pugnare.

(*b*) Et quod omnibus fructibus amissis *domi* nihil erat quo famem tolerarent Allobrogibus imperavit ut *iis* frumenti copiam *facerent*; ipsos oppida vicosque, quos incenderant restituere iussit. Id ea maxime ratione fecit, quod noluit eum locum, unde Helvitii discesserant, vacare, ne propter bonitatem agrorum Germani, qui trans Rhenum incolunt, e suis finibus in Helvitiorum fines transirent et finitimi Galliae provinciae Allobrogibusque essent.

2. Parse and explain the construction of the words in italics.

Translation.

(*a*) It proved a great impediment to the Gauls as regards the fight for several of their shields being transfixed and bound together by a single blow of the javelins, they could not, when the iron had bent itself, either pull them out nor with their left hand embarrassed, could they fight conveniently enough; so that many, their arms being tossed to and fro for a long time preferred to cast their shields from their hands and with the body unprotected.

(*b*) And because all the fruits of the ground being lost there was nothing at home by which they could avert starvation, he ordered the Allobroges to procure a supply of corn for them, and ordered themselves to rebuild the towns and villages which they had burned. He did that principally for this reason, because he was unwilling that the place from which the Allobroges had departed should be unoccupied, lest the Germans who dwell beyond the Rhine, should in consequence of the fertility of the lands, cross over from their own territories into the territories of the Helvitti, and should be neighbours to the province of Gaul and the Allobroges.

PARSING.

Transfixis—abl., pl., neut., complete part, trans. verb, 3rd, conj., *transfigo*, *fixi*, *fixum*, *figere*, forming with 'scutis' abl. absolute.

domi—sometimes considered a gen. of 'domus' but more properly a locative meaning 'at home,' and equivalent to an 'adverb of place.'

iis—dat., pl., indirect object, demons. pron., *is*, *ea*, *id*.

facerent—trans. verb, 3rd conj. *facio*, *feci*, *factum*, *facere*, subj., impef., 3rd pers., pl., agr. with (allobroges).

3. What are the rules of *oratio obliqua*?

In *oblique narration* the principal verb must be in the *infinitive* mood, and the subordinate clauses that express the *original speaker's words* or *opinions* will have their verbs in the *subjunctive* mood.

4. Translate into Latin :—

(*a*) Cæsar feared lest the Germans should occupy the territories of the Helvitii,

(*b*) If I find your son in the city, will you not rejoice greatly?

(*c*) The General married the daughter of the King.

Translation.

(*a*) Cæsar timebit ut Germani fines Helvitiorum occuparent.

(*b*) Si filium tuum in urbe inveniam, nonne multum gaudebis?

(*c*) Dux filiam regis in matrimonium duxit.

Teaching.

1. How would you begin to teach Grammar to a Second or Third Standard? Give a short outline of a first lesson.

FIRST LESSON IN GRAMMAR TO STANDARD II.

Having written a few very simple sentences on the blackboard such as 'birds sing,' 'boys talk,' 'ducks swim,' the pupils will be brought to see that there are two essential parts (1) a naming part, and (2) an acting or affirming part. From these the two fundamental parts of speech, the noun and the verb, may be illustrated; the naming part being the *noun* and the affirming part the *verb*. For a first lesson names of persons, as boy, girl, man, woman; names of trades, as farmer, sailor, baker, &c., can easily be got, and the pupils will see that though these words agree in being names of persons, yet they differ in not being *the same* person. Thus, the word *baker* is a noun because it denotes a person who bakes; the word *sailor* is a noun because it denotes a person that sails, and so on; further examples being got from the class, with reasons for the words being nouns.

2. Write notes of a Lesson for an Infant Class on 'Money.'

NOTES OF A LESSON ON 'MONEY.'

I. THINGS TO BE SEEN AND INSPECTED.—*Real coins: farthing, halfpenny, penny; threepenny piece; sixpence, shilling, florin, half-crown, and the others, if thought necessary.*

II. INTRODUCTION.—Question as to who have gone to shop; what was bought? what some would like to buy; what is buying? what was paid? and name of what is given for goods bought; thus eliciting the term 'Money.'

III. WHAT IS MONEY?—Coins of metal (let the metallic ring of a coin be heard), as gold, silver, bronze; different names given to distinguish the coins—which is the most valuable?—children to examine the coins, and tell what they see on them, their shape, colour, comparative weight, hardness.

IV. USES OF MONEY.—Paying for work done; goods bought; railway fares; question as to saving money as provision for old age; helping parents; children can save money by being careful of their clothing, books, &c.

END OF FOURTH YEAR.

FIRST PAPER.

(*Two hours and a half allowed for this paper.*)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word 'Acknowledgement.'

Write in small hand, as a specimen of copy-setting, the sentence 'Kind hearts are more than coronets.'

Arithmetic.

MALES.

(*Solve any* TWO *of the following questions.*)

1. At what rate of interest will the present worth of £99 8s. 9d., payable two years hence, be £92 10s.?

£99 8s. 9d. − £92 10s. = £6 18s. 9d. interest for 2 yrs.

Pres. worth Pres. worth Interest

£92 10s. : £100 :: £6 18s. 9d. : rate for 2 yrs.

or 1665d.

$$\frac{1665\text{d.} \times 100}{92 \cdot 5} = 1800\text{d.} = £7\tfrac{1}{2}.$$

∴ £7½ for 2 yrs. = $\underline{3\tfrac{3}{4}}$ p.c. per annum.

2. Two men run a race, the one at the rate of 350 yards a minute, the other 325; express in miles the distance by which the former will beat the latter in a distance of 3½ miles.

(*a*) Yds. in 3½ mls. = 1760 × 3½ = 6160 yds.

(*b*) No. of min. run by 1st = $\underline{\tfrac{6160}{350} =}$ 17⅗ min.

(*c*) The 1st gains 25 yds. every min. and ∴ he gains 25 yds. × 17⅗ or 440 yds. in 3½ mls. and 440 yds. = $\underline{\tfrac{1}{4}\text{ ml.}}$ Ans.

3. The surface of a rectangle 8 inches wide is the fifth part of a square yard; find its length.

$$\text{Length of rectangle} = \frac{\tfrac{1}{5}\text{ of 9 sq. ft.}}{8\text{ in.}}$$

$$= \frac{9 \times 144}{5 \times 8}\text{ in.}$$

$$= \tfrac{162}{5} = 32\tfrac{2}{5}\text{ in.} = \underline{2\text{ ft. }8\tfrac{2}{5}\text{ in.}}$$

FEMALES.

1. For what time was £156 5s. invested at 2¾ per cent. when it amounted to £175 3s. 1½d.?

$$\left.\begin{array}{lcl} £2\ 15\text{s.} & : & £18\ 18\text{s.}\ 1\tfrac{1}{2}\text{d.} \\ \text{or} & & \text{or} \\ 1320\text{ halfd.} & & 9075\text{ halfd.} \\ £156\tfrac{1}{4} & : & £100 \end{array}\right\} :: 1\text{ yr.} : \text{time}$$

$$\frac{1\text{ yr.} \times 9{,}075 \times 100 \times 4}{1320 \times 625} = \underline{4\tfrac{2}{5}\text{ yrs.}}\ \text{Ans.}$$

2. *See 3rd yr. Arithmetic. Males. No. 2.*

3. If 30 men can reap 60 acres of wheat in 15 days of 14 hours each, how many days should 20 men and 35 women take to cut 86⅔ acres, if three women do as much as two men?

$$35\text{ women} = 35 \times \tfrac{2}{3} = 23\tfrac{1}{3}\text{ men.}$$

$$\left.\begin{array}{lcl} 43\tfrac{1}{3}\text{ men} & : & 30\text{ men} \\ 60\text{ ac} & : & 86\tfrac{2}{3}\text{ ac} \end{array}\right\} :: 15\text{ days} : \text{time}$$

$$\frac{15\text{ days} \times 30 \times 86\tfrac{2}{3}}{43\tfrac{1}{3} \times 60} = \frac{45\text{ days} \times 90 \times 260}{130 \times 180} = \underline{15\text{ days.}}$$

4. *See 3rd yr. Arith. Males. No. 1.*

Euclid.

(*Bookwork, well done, will get "G"*)

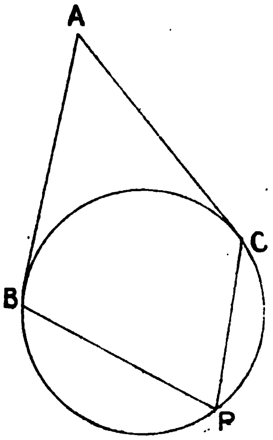
1. If a side of any triangle be produced, the exterior angle is equal to the two interior and opposite angles, and the three interior angles of every triangle are equal to two right angles.

Bk. I., Prop. 32.

2. The opposite angles of any quadrilateral inscribed in a circle are equal to two right angles.

Bk. III., Prop. 22.

3. Two tangents are drawn to a circle from a point A, meeting it in B and C. P is any point on the circumference outside of A B C. Show that the sum of the angles A B P, A C P is constant.



Since the figure A B C P is a rectilineal quadrilateral figure, its four interior angles are equal to four right angles. Now since the angle at A is constant, and the value of the angle B P C is the same wherever P may fall on the circumference, being always in the same segment, therefore the sum of A B P, A C P will always equal the difference between four right angles and the sum of the two constant angles B A C, B P C. Wherefore the sum of A B P and A C P is constant.

Q.E.D.

Algebra.

(Solve any *three* of the following questions.)

1. Simplify—

$$\frac{x(x+y)}{x^2-y^2\,(x-z)}+\frac{y(y+z)}{(y^2-z^2)\,(y-x)}+\frac{z(z+x)}{(z^2-x^2)(z-y)}$$

After cancelling, the above expressions become :

$$\frac{x}{(x-y)(x-z)}+\frac{y}{(y-z)(y-x)}+\frac{z}{(z-x)(z-y)}$$

since $\frac{y}{(y-z)(y-x)}=\frac{y}{(y-z)\times-(x-y)}=$

$$-\frac{y}{(y-z)(x-y)}.$$

$$\frac{z}{(z-x)(z-y)}=\frac{z}{-(x-z)\times-(y-z)}=\frac{z}{(x-z)(y-z)};$$

Therefore the expression

$$=\frac{x}{(x-y)(x-z)}-\frac{y}{(y-z)(x-y)}+\frac{z}{(x-z)(y-z)}$$

L.C. Denominators $=(x-y)(x-z)(y-z)$

Therefore the expression becomes

$$\frac{x(y-z)}{(x-y)(x-z)(y-z)}-\frac{y(x-z)}{(x-y)(x-z)(y-z)}+\frac{z(x-y)}{(x-z)(y-z)(x-y)}$$

$$=\frac{xy-xz-xy+yz+xz-yz}{(x-y)(x-z)(y-z)}$$

$$=0.$$

2. Solve the following equation—

$$\frac{(x+1)(x+2)}{x^2-1}=\frac{7}{3}+\frac{16-x^2}{2x(4+x)}$$

After cancelling, the equation becomes

$$\frac{x+2}{x-1}=\frac{7}{3}+\frac{4-x}{2x}$$

Clearing of fractions

$$6x^2+12x=14x^2-14x+12x-12-3x^2+3x$$

Transposing and collecting

$$5x^2-11x=12$$
$$x^2-\tfrac{11}{5}x=\tfrac{12}{5}$$

Completing square

$$x^2-\tfrac{11}{5}x+\tfrac{121}{100}=\tfrac{12}{5}+\tfrac{121}{100}=\tfrac{361}{100}$$

Taking the root

$$x-\tfrac{11}{10}=\pm\tfrac{19}{10}$$
$$x=\tfrac{11}{10}\pm\tfrac{19}{10}=\underline{3}\ (\text{or }-\tfrac{4}{5}).\quad\text{Ans.}$$

3. An ox is sold for £24. The gain per cent. is equal to the original cost of the animal. What was the cost.

Let £x = the prime cost,

$$x\text{ per cent of }x=\frac{x}{100}\text{ of }x=\frac{x^2}{100}$$

$$\therefore x+\frac{x^2}{100}=24$$

$$100x+x^2=2{,}400$$

Completing square

$$x^2+100x+2{,}500=4{,}900$$

Taking root

$$x+50=\pm 70$$
$$x+70-50=\underline{£20.}\quad\text{Ans.}$$

4. The radius of a circle being 9 ft., find the area of a sector having an angle of 55 degrees.

(*a*) The area of the circle $=9^2\times 3{\cdot}1416=254{\cdot}47$

(*b*) $360^\circ : 55^\circ :: 254{\cdot}47$: required area.

$$\frac{254{\cdot}47\times 55}{360}=\frac{254{\cdot}47\times 11}{72}=38{\cdot}877$$

$\therefore$ Area of Sector $=\underline{38{\cdot}877}$ sq. ft. Ans.

Grammar.

'The king I fear is poisoned by a monk:
I left him *almost speechless*, and broke *out*
To acquaint you with this evil, that you might
The better arm you to the sudden time,
Than if you had at leisure *known* of this.

1. Give a general analysis of the above passage.
2. Parse the words in *italics*.

GENERAL ANALYSIS.

A. 'I fear.'—*Principal sent.*

a. '(that) the king is poisoned by a monk.'—*Subord. noun sent. object of A.*

B. I left him almost speechless.—*Principal sent.*

C. I broke out to acquaint you with this evil.—*Principal sentence. Co-ord. with B.*

c^1. 'that you might the better arm you to the sudden time.'—*Subord. adv. sent, of purpose to C.*

c^2. 'than (you would have done).'—*Subord. adv. sent. of comparison to C.*

c^3. 'if you had at leisure known of this.'—*Subord. adv. sent. of condition to c^2.*

PARSING.

almost—adv. of degree mod. 'speechless.'
speechless—predicating adj., qual. 'him.'
out—adv. place mod. 'broke.'
The—adv. mod. 'better.'
better—adv. of manner, com. deg., mod. 'arm.'
arm—reg. trans. verb, act., infin., pres., gov. by aux. verb 'might.'
Than—subord. conj., introd. elliptical sent. of comparison.
known—complete part. of irreg. verb ; *know, knew, known*, forming, with 'had,' past perf., indic.

3. Tell the derivation of :—*March, Circumference, Catastrophe, Finger, Grandfather, Marigold, Calico, Centigrade.*

Word.	Derivation.
March	(Latin) *Mars*, the god of war.
Circumference	(Latin) *circum*, round about, and *ferre*, to carry.
Catastrophe	(Greek) *cata*, down, *strophe*, a turning.
Finger	(English) probably from the same root as 'fang' (*fangen*, to seize).
Grandfather	(Latin through French) *grand*, great; (Saxon) *fader*, or *fæder*, a father.
Marigold	(Hebrew) Mary (French, Marie), and (English) *gold* or *gould*, gold.
Calico	(Indian) *Calicut*, the town whence it was imported.
Centigrade	(Latin) *Centum*, a hundred; and *gradus*, a step, a degree.

4. Correct any errors in the following sentences :—

(*a*) The room was full from one end to another.
(*b*) Neither James nor his brother knew their lessons to-day.
(*c*) He went out to get change of a sovereign.
(*d*) Are either of these boys your friend?

Corrections.

(*a*) The room was filled from one end to the other.
(*b*) Neither James nor his brother knew his lessons to-day.
(*c*) He went out to get change for a sovereign.
(*d*) Is either of these boys your friend?

SECOND PAPER.

Geography.

(*Three hours allowed for this Paper.*)

1. Draw a map of the Mediterranean.

2. Give some account of the Gulf-stream.

The Gulf Stream.

The main stream of the great Atlantic current sweeps past the coast of S. America, and, passing through the Windward Islands and across the Caribbean Sea, enters the Gulf of Mexico, where it gets the name of the 'Gulf Stream.' As the current sweeps round the Gulf it becomes very warm, and is swollen by the waters of the Mississippi till at length it forces its way out into the Atlantic between Florida and Cuba, in a stream of from

30 to 40 miles wide, and 600 or 700 feet deep, and at a speed of about 80 miles a day. At first it keeps pretty close to the coast of America, but by degrees widens out, and bears away to the east, running between Newfoundland and the Azores. There it parts. The main body turns round the Azores, and goes off southwards between those islands and Spain down to the African coast. The other portion runs on northward between Britain and Iceland, giving warmth and moisture to Cornwall, Ireland, the Hebrides, and the Shetland Islands. The northward motion of the Gulf Stream necessitates a southward motion from the Polar Seas, and so a current of cold water runs immediately beneath it past Labrador to replace the warm water brought from the tropics.

3. Describe the physical features and productions of British Columbia. What advantages does it offer to emigrants?

The eastern boundary of British Columbia is formed by the Rocky Mountains, and in this part of the immense range is Mount Hooker. Most of British Columbia is high table-land, propped up by the Rockies on the one side and the Cascade Range on the other. Through this table-land the rivers Skeena and Fraser have gnawed out deep ravines, just as the Pacific has fretted the shores into creeks and inlets. The mountain sides are covered with magnificent forests, haunted by the grizzly bear, and the plateau between the ridges is covered with grassy prairies.

The climate is not very pleasant and the settlers who resort thither are attracted by the gold along the River Frazer.

Vancouver Island, about the size of Scotland, though mountainous and barren abounds in coal, the export of which to places on the seaboard affords the chief source of wealth to the capital, Victoria. Other sources of wealth are gold and salmon fisheries. So plentiful are salmon on the Columbian rivers that in some places during the spawning season the fish have been known to push each other ashore. Land is obtained on easy and liberal terms, and there is a great demand for female servants as the males largely outnumber the females.

History.

(Answer *any two* of the following questions.)

1. Give some account of the Scottish Parliament and Privy Council in the period 1603-1707.

2. State, with dates, the terms of the Secret Treaty of Dover, the Habeas Corpus Act, and the Riot Act.

3. What do you know of Robert Walpole and the elder Pitt?

4. State generally the causes that led to the Crimean War, the terms of the treaty that closed it, and any terms of the treaty that have since been allowed to fall into desuetude.

(2) In 1670 Charles II. concluded with Louis XIV. a Secret Treaty at Dover in which Charles agreed—(*a*) to declare himself a Roman Catholic; (*b*) to aid Louis in his designs on Holland and Spain; Louis agreed to pay Charles a pension of £120,000 a year, and to send 6,000 men in case of opposition in England.

Habeas Corpus Act passed 1679 declares that:—(*a*) All persons, except those charged with treason or felony, can demand a writ directing the jailer to bring them before him so that the legality of their imprisonment may be tested.

(*b*) All persons charged with treason or felony must be tried at the next sessions after commitment or else admitted to bail.

(*c*) No person can be recommitted for the same offence.

The Riot Act was passed in the reign of George I. (1715) and provides that if any persons to the number of twelve or more meet for the purpose of disturbing the peace, and a magistrate or other officer reads an order commanding them to disperse, all who remain after that order are guilty of felony.

(3) Sir Robert Walpole Earl of Orford was the greatest statesman of the first half of the eighteenth century. He studied at Cambridge and entered parliament where he soon gained such a reputation as to be made secretary of war and to have other appointments, but a change of parties deprived him of his offices and sent him to the Tower. On the accession of the House of Hanover he again came to the front, and from 1714 to 1742, with the exception of three years when the South Sea scheme was in full operation, he guided the affairs of England. His personal history is lost in that of England; and few, except his own partisans, can look on that long period as one in which this country was even maintaining its reputation for honesty. He ruled the Commons by bribery and the king by the grossest flattery. He was made a peer for his services and died in 1745.

William Pitt, Earl of Chatham, was a great parliamentary orator and political leader of the last century. After studying at Oxford he entered the army, but being elected a member of parliament he set out on a career which led him more rapidly and surely to fame. From his great abilities he rose to be Secretary of State which he held almost continuously till the end of the reign of George II. His administration was marked by great vigour and enterprise, and it was so successful that the people dazzled by the great victories forgot the heavy taxes imposed to maintain the armies. On the accession of George III. he resigned his post, but when American affairs became critical he was made head of the government. However the ministers he had collected were of too miscellaneous and inconsistent a kind and he soon laid down office again. He appeared in his place as usual and spoke in favour of Wilkes and the Dissenters against the American war till he closed his career by falling in a fit on the floor of the House of Lords. Carried to his house he never rallied but died in 1778.

Composition.

Write an essay on the utility of History as a school subject.

HISTORY.

History and especially the history of one's own country is very properly made a subject of study in schools. It is a study which tends very materially not only to bring out the critical powers but also to strengthen the moral sense of the student. There is but little doubt that the reading of a trustworthy record of the deeds done by British heroes and statesmen must have a beneficial effect upon the minds of British boys and girls, as our history is full of the very best lessons for them. History must not be considered a mere catalogue of kings and queens with the events of each reign to be committed to memory; but the pupils must be trained to follow out the gradual development of the nation by observing the steady process of its growth under certain never changing laws. A more important function of the study of history is to prepare the young for taking their places and performing their parts as good citizens of the greatest nation on the face of the globe. Great care must be taken in studying history not to take a one-sided view of the national character, but to see that the triumphs of peace have been as glorious as the victories of our warriors, and also not to form an over estimate of our nation, but to learn that other nations have their history and must feel like ourselves that they also are countrymen of no mean country.

Latin.

1. Translate :—

Æolus hæc contra : 'Tuus o regina, quid optes,
Explorare labor ; mihi jussa capessere fas est.
Tu mihi, quodcunque hoc regni, tu sceptra Jovemque,
Concilias ; tu das *epulis* accumbere divum,
Nimborumque facis tempestatumque potentem.'
Hæc ubi dicta, cavum conversa *cuspide* montem
Impulit in latus ; ac venti velut agmine facto,
Qua data porta, ruunt, et terras turbine perflant.
Incubuere mari, totumque a sedibus imis
Una Eurusque Notusque ruunt creberque procellis
Africus, et vastos *volvunt* ad litora fluctus :
Insequitur clamorque virum stridorque rudentum.

2. Parse and explain the construction of the words in italics.

3. Express in Latin in as many ways as you can—'Ambassadors came to Rome to sue for peace.'

4. Translate into Latin :—

Orgetorix persuaded the Helvetii to quit their territories and seek a new settlement (sedes). They were easily persuaded, because they were prevented by their narrow confines from making war on their neighbours. They established peace and friendship with the states through whose territories they intended to pass, and at the same time asked the Raurici and others to burn their towns and go with them.

OPTIONAL.

5. Translate :—

Interea, dum haec geruntur, hostium copiae ex Arvernis equitesque, qui toti Galliae erant imperati, conveniunt. Magno horum coacto numero cum Caesar in Sequanos per extremos Lingonum fines iter faceret, quo facilius subsidium provinciae ferri posset, circiter millia passuum x ab Romanis trinis castris Vercingetorix consedit convocatisque ad concilium praefectis equitum venisse tempus victoriae demonstrat.

(1) Æolus says thus in reply:—'Thy work, O queen, is to discover what thou wishest; it is my duty to perform with zeal what thou dost command. Thy gift to me is all this kingdom which I have, and this my sceptre, thou makest Jove my friend, thou grantest me a seat at the banquets of the gods, and causest me to be lord of storms and tempests.'

When these words were said he turned the point of his spear and pushed on its side the hollow mountain; and the winds as in a formed line rush forth where a passage is given them and blow with a blast across the world. They swoop down upon the sea and Eurus (the east wind), and Notus (the south) and the storm-crowded Africus (the south-west), together lash the whole ocean from its lowest depths, and roll huge billows to the shore. Then follow the shouts of the men and the creaking of the cordage.

PARSING.

(2) *Epulis*—locative abl. pl. noun, 1st decl., *epulae, epularum.*

cuspide—abl. absol. with *conversâ*, noun, 3rd decl., *cuspis, cuspidis.*

Incubuere—trans. verb, 3rd conj., *incumbo -cubui -cubitum -cumbere*, pret., indic., 3rd pers., pl., subj. (venti).

volvunt—trans. verb, 3rd conj., *volvo, volvi, volutum, volvere*, pres., indic., 3rd, pl., subj., Eurus, &c.

(3) Ambassadors came to Rome to sue for peace: Legati Romam venerunt (*a*) *pacem petitum;* (*b*) *pacem petendi causâ*, or *pacis petendæ causâ;* (*c*) *ad pacem petendum*, or *ad pacem petendam;* (*d*) *pacem petituri;* (*e*) *qui* or *ut pacem peterent.*

(4) Translation into Latin:—

Orgetorix Helvitiis persuasit ut de finibus suis exirent et novas sedes peterent. Id facile iis persuasum est, quod angustis finibus prohibiti sunt quominus finitimis bellum inferre possent. Pacem et amicitiam cum civitatibus, quarum per fines iter facere iis erat in animo, confirmârunt, et eodem tempore ab Rauricis et aliis petiêrunt ut oppidis suis exustis una cum iis proficiscerentur.

OPTIONAL.

(5) In the meantime while these things are being done, the forces of the enemy and the horsemen of the Arverni, who had been demanded from all Gaul, assemble. A great number of these being collected, when Cæsar was passing through the frontiers of the Lingones against the Sequani, a reserve force was the more easily obtained; about ten miles from the three camps Vercingetorix encamps, and having called a council of the prefects of cavalry, he shows that the time for victory had come.

Teaching.

What points would you most insist on in the reading of Sixth Standard scholars? What common faults are to be guarded against in the reading of poetry? or,

Write an outline of a lesson on—

(*a*) The Revolution of 1688; or,
(*b*) The Indian Mutiny.

In the reading of Sixth Standard scholars I should endeavour to make them as far as possible read so intelligently and expressively as to enable me to follow the meaning easily and rapidly when listening without a book. To attain this excellence attention must be paid to the utterance of vowel and consonant sounds, so that the full sound of the word may be heard; to correct accent and emphasis; to the pitch and modulation of the voice; and to the giving of such practice that the scholar's reading may become as natural as when he narrates some incident of his daily life to his schoolfellow.

In reading poetry the common faults are a sing-song style, pausing at the cæsura, and allowing the voice to fall at the end of the lines, regardless of the meaning—the last fault being most usual when the poetry is rhymed.

Oral Teaching: The Preparation of Lessons and of Notes of Lessons.

BY JOSEPH H. COWHAM, F.G.S.,

Master of Method: Westminster Training College.

How to Give a Lesson.

A. The Introduction.—If the lesson be one of a well-arranged series, as we strongly advise it should be, it will suffice to revise briefly the chief points taught in the previous lesson; in this way a connection is easily and naturally established between that already acquired and the new matter to be taught. A few questions will be sufficient to recall the most important facts and truths of the past lesson, and serve to arouse the mental activity of the class, and also to awaken their sympathy and enlist their co-operation. If no previous teaching is available upon which to base an introduction, announce the subject and at once begin to teach it.

The young teacher is strongly cautioned against attempting to lead the children to the subject of his lesson by a process of training. Such introductions are often attempted, and are very rarely successful. A teacher recently gave a lesson on 'Chalk.' As the children were in a London school he thought they might know Brighton. By questioning them, he found that many of his scholars had been there. 'Well, what did you notice?' said the teacher. 'Boats, the steamer, the pier.' These and other objects of interest were given in answer by different children; some boys were anxious to cause a diversion by suggesting donkeys, niggers, &c., but one boy fortunately thought of the '*cliff*.' 'Yes,' said the teacher, delighted to be getting near, as he thought, to the subject of his lesson. 'What was the cliff composed of?' 'Stone,' 'concrete,' 'cement,' said the children in succession. 'No, I don't want those,' said the teacher, almost in despair. 'What are the cliffs composed of when you get away from the town?' After wasting five minutes' time, and still worse, after diverting the thought of the class from the subject to a host of particulars of no value for the purposes of his lesson, he proceeded to examine specimens of chalk with which he had provided himself. This was where he might well have begun his lesson, but having taken the children in thought to Brighton, it was with difficulty that he brought them back to observe the specimens of chalk he held before them.

As soon as possible, therefore, pass over a carefully thought out introduction, and proceed to make the class understand that you have something new to impart. Children soon weary of revising past work; the introduction should quickly place the scholars in the attitude of those who are anxious to learn, and the best way to ensure this is to show them that the teacher is prepared with a lesson he is able to teach.

A **Grammar** Lesson is easily introduced by placing sentences on the board for inspection by the class.

An **Object** Lesson by the exhibition of an object, or a picture, or by the performance of an experiment.

A **Geography** Lesson by showing a model of the district selected for teaching.

A **Reading** Lesson by a very brief account of the subject of the lesson, of its author, or of the conditions surrounding the events of which the lesson is an account.

A **Writing** Lesson by the exhibition of a few very common faults in the writing of the class, followed by a specimen of excellent writing in the teacher's best style.

The **Arithmetic** Lesson is best prefaced by a few simple examples, to be worked by the class mentally and embodying as far as possible the rule to be taught or applied.

B. The Lesson proper and how its matter may be communicated.—Every lesson should aim at carrying further the knowledge already in the possession of the class, and whilst the children may be led to secure some of the new knowledge for themselves there will necessarily be other matter which must be communicated by the teacher. He must, however, be always on his guard against continuously talking to his class for more than a few seconds at a time. There is danger, unless this caution be observed, that too much matter will be supplied for complete reception by the class; when this fault occurs it will be evident in the indifference which the children soon begin to manifest; the method of teaching must be immediately changed; the children must be encouraged to take a more active part in the lesson; questions must be asked upon what has been told, and attempts must be made by the children to connect what has been taught with anything they previously knew. In this way the teacher will be able to impart new matter suited to the capacity of the children; he will secure the advantages of a thorough review of what has been already learned without the irksomeness of a formal revision; new matter will also be associated, and thus the laws of memory will be observed; erroneous notions will be discovered as soon as formed and before they have become established, and through all the lesson the teacher will carry with him that thought and effort on the part of his scholars which no amount of lecturing alone is able either to arouse or to maintain.

(a) Matter taught by a judicious admixture of Statement, Illustration, and Questioning.—Much of what is called 'tact' in teaching is the power a teacher manifests during the development of his lesson to determine which mode he shall adopt in communicating his information. It is obvious that when an object or an experiment is under observation there is very much that the children themselves should state, and the more they can be encouraged to tell the better; at the same time there are less obvious qualities in an object, and there are subtle processes in an experiment to which the attention of his class must be directed by the teacher.

Examples of Teaching:—

1. Suppose the teacher wishes to show his class the effect of heat upon solids and liquids, he may perform the experiment illustrated by Fig. 1.

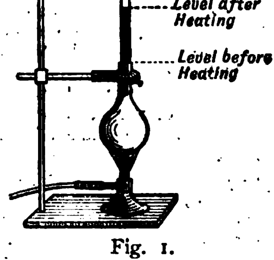


Fig. 1.

At first, after applying heat, the water is noticed to fall slightly in the tube; after a few seconds and after further application of heat the water will begin to rise, and will continue to do this with the continued heightening of the temperature of the water in the vessel. In this experiment the immediate effects are apparently contradictory. Something has escaped the notice of the class; the rising of the water in the tube is clearly due to the expansion of the liquid under the influence of heating. This effect is noticed and will be at once stated by the class in answer to the question, 'What do you observe?' The cause also of what they observe may be obtained from the class, for the only change of condition has been the application of heat. It will be necessary for the teacher now to call the attention of his pupils to the fact that the glass vessel would first feel the effects of heating; if it expand then the vessel will hold more water than at first, and this expansion of the glass will manifest itself in the slight lowering of the water in the tube. In this way our experiment has taught two truths. (1) That heat causes water to expand. (2) That heat also causes the glass vessel containing the water to expand. The first truth, both as to effect and cause, follows directly from the experiment, and is entirely worked out by the class by means of observation, reasoning, and of statement, stimulated and guided by the questioning of the teacher. The second truth, so far as effect alone is concerned, is observed and stated by the class; but further direction and statement on the part of the teacher are required before the cause of what they observe is made clear to the minds of his pupils. Suppose, further, that a number of experiments show that whenever heat is applied to solids and liquids the class may observe the same result. The general truth '*that heat causes solids and liquids to expand*' will soon be established in the minds of the pupils, and should find expression from them in the truth or law just enunciated.

2. In order further to assist in distinguishing what must be told by the teacher from what may be found out and stated by the class, the example of teaching followed on page 304 in the *Practical Teacher* of last month may be quoted. When the functions of the Pronoun had been taught through the examination on the part of the pupils of many examples selected by the teacher, and when these functions had been stated by the class, then the new term 'Pronoun' was immediately supplied by the teacher, whilst its definition was made by the class.

(3) An instance of the attempt frequently made to lead children to state what the teacher should tell will complete our examples. By a careful examination of numerous sentences, under the direction of the teacher, the distinction between the word or group of words which indicate the doer of an action, and the word or group of words which denote the action, has been established in the minds of the children; instead, however, of immediately associating the terms *subject* and *predicate* with each group of words respectively, there is interposed an attempt to train out these words; the children are asked to state the name we use of a book to signify 'the person, or place, or thing which it is all about;' or they are told to think of hearing a sermon, and to name the topic about which the preacher discourses; or of a story, the person about whom it is told. In this way the various uses of the term '*subject*' are introduced as though their introduction could in any way be made helpful to the association of the word subject with its technical application in grammar. Instead of assisting the child to the right use of the terms Subject and Predicate, this method confuses the child, and by the time the term is supplied its grammatical value has become much weakened, if not entirely lost. As soon as the children have seized a notion, let the teacher immediately supply the term associated with it.

In these examples the following conditions of teaching the matter of a lesson are enforced:—

1. That children should be encouraged to state fully what they know already, and what they observe during the progress of a lesson.

2. That the teacher must be ready to state those conditions and those facts which may fairly be expected to escape the notice of his pupils, or may be beyond their knowledge.

3. That whilst the teacher collects and arranges his facts and his examples, the children must be led to compare and to classify them, and also to announce the results of their comparisons and reflections.

4. That children should tell the teacher all they observe in an experiment, and, under the guidance of the teacher, be led to state the less obvious effects, and, further, by processes of reasoning, to connect these with their causes.

5. That the operation of teaching exemplified above is an admixture of illustration, questioning, and statement judiciously distributed and arranged by the teacher with the hearty co-operation of his class.

(b) Questions: their place and power.

A question when put by the teacher to a group of children assumes more or less knowledge on the part of the class of the subject with which it deals, and its effect should be to arouse the scholars to use the knowledge they have for the purpose (1) of making it more perfect, (2) of associating with it other and less familiar matter, and (3) of acquiring information that is entirely new. Questions intended to recall matter previously taught are easily formed, and are named, with slight variations of meaning, **Tentative, Revision, Recapitulation**, and **Examination questions** respectively. Questions which serve the purpose of exercising the mind in finding out wherein its knowledge is faulty, in supplementing knowledge that is incomplete, and in accumulating fresh knowledge, may with justice be termed **Educational**.

1. **Tentative questions** are used at the beginning of a lesson, and at every new departure during the progress of the lesson; they are used to discover the amount and character of the knowledge already possessed by the class. As the teacher cannot be sure of any individual scholar being able to answer them, they ought to be put so that any child may show his ability to answer by show of hand. Tentative questions should be few, and be rapidly completed.

2. **Questions of Revision** are asked at the finish of each stage of the lesson, and should be put so as to review the information taught in the order in which it was originally acquired; in this way the associations of matter first formed are still further strengthened, and, as a consequence, the permanent retention of knowledge and its ready recovery are aided. It is further necessary to revise before the amount of matter taught becomes great, for if delayed too long the first impressions become weakened, and may possibly be lost altogether. This is evident when a teacher, during revision, finds it necessary to help his class in their attempts at recovery.

3. **Recapitulation Questions** are of the same nature, and have the same force as 'Questions of Revision.' They come at the end of a lesson, and thus form the final review of the matter taught.

4. **Examination Questions** are set either over a wide range of subjects, or upon a considerable area in any particular subject. They are useful as a stimulus to thorough review on the part of the pupil, especially when the range of matter is not great; and they further serve to bring out the ability of the pupil, particularly if they are framed with the view of requiring an application of knowledge acquired rather than a display of facts which have been committed to memory. When however, the range of topics is very wide, and the questioning is satisfied with an exercise of memory, the examination becomes of doubtful value, and sooner or later cultivates 'cram' of the worst kind.

5. **Educational Questioning.**—This is the form of questioning most important to acquire, and most difficult to describe. It assumes great variety of forms, changing with every lesson and with every teacher. In common with the modes of questioning already described, it rests upon knowledge which the children have previously acquired, but differs in that this is used chiefly to advance to further knowledge, and in order to arouse in the class mental effort of the highest order. The successful answer to such questioning demands, it may be, the new association of notions already familiar in their separate condition. In this case the *imagination* of the pupil is exercised. Frequently it requires the arrangement of like facts and examples so as to arrive at a new, or an extended and generalized truth, thus calling into activity (1) the *judgment* in the arrangement of classes of facts, and (2) the *reasoning power* in arriving at and in formulating the new truth.

Examples of Teaching. (*a*) Exercise of Memory.

If, for example, I ask a class to tell me what they have learned about the earth as to its shape, its size, and its movements, I shall receive in reply a number of facts which have been stored in the mind from previous lessons, and which are now reproduced by an effort of *memory*.

(*b*) Exercise of Observation and of Judgment.

I proceed to make these facts the basis of a lesson on similar bodies in the solar system, selecting Mars because of its many points of similarity with our earth, and Jupiter on account of its points of contrast.

I first direct attention to some simple balls,* constructed so as to illustrate the relative size of these heavenly bodies, and placed so as to show their relative distance from the sun. A few moments are allowed for observation on the part of the class, and then the teacher asks one of its members to state what he notices about the distance of these objects from the sun; another is asked to state what he observes about their sizes. In this way he obtains, in answers from the class, 'that Jupiter is much further from the sun than either the earth or Mars,' and that 'whilst Mars is less than the earth, Jupiter is much larger than either.' The questions in this case have exercised and directed the *observation* of the children, and their answers indicate that they have made successful efforts of comparison, thus calling into action a simple form of *judgment*.

(*c*) Exercise of Memory and of Judgment.

More information is now supplied by the teacher—'that Jupiter rotates on its axis once in about 10 hours, whilst Mars takes 24½ hours, and the earth about 24 hours. A question is now of service requiring the scholars to calculate the length of day on each of the heavenly bodies respectively. In their answers the children *associate* the length of day with the period of rotation. In the same way I may deal with the inclination of the axis of each heavenly body from the perpendicular to the plane of its orbit, and show by diagram or model that, whilst the axis of the earth is inclined 23½°, that of Mars is nearly 29°, whilst that of Jupiter is inclined only 3°. If a lesson on the earth's seasons has been given previously, a question will be sufficient to enable the pupil to connect the inclination of the axis of Mars with a similarity of seasons on both the earth and Mars, and also to contrast the seasons in Jupiter with those of the smaller planets. Groups of facts are in this way being formed, and are so arranged as to be easily *remembered*, whilst in the effort of arrangement there is an exercise and training of the *judgment*.

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* See Notes of Lesson in *Practical Teacher* of this month.

(*d*) Exercise of Reasoning.

Sufficient facts are now accumulated for the exercise of higher efforts of intellect, *e.g.*, if the children are led by a series of questions of revision to recall the many points of similarity established between the earth and its neighbour Mars—distance from the sun, period of revolution, length of day, their seasons, and then add that both have a surface covered in part with land and in part with water, and that both have an atmosphere—the class might now be asked to conjecture any other probable similarity. The answer 'life, animal and vegetable,' would manifest the ability on the part of the class to adopt the imperfect form of reason termed *analogy*. If, now, we take the three heavenly bodies under consideration, and require the class, in answer to our questions, to state the points of agreement amongst them all—revolving round the sun, and shining with reflected light—then ask them to distinguish these resemblances from the points in which they disagree, we get an excellent exercise of the judgment; and when we apply the name 'planets' to these heavenly bodies and further ask the class to define the term, then by the successful effort to answer the question we have aroused and exercised one of the highest intellectual powers possessed by our pupils, viz., that of *abstraction* and of *inductive reasoning*.

In the above sketch we have endeavoured to show how the skilful use of questions may awaken the class to the exercise of **memory and imagination**; to the formation of **general notions** and of correct **judgments**; and lastly, to simple exercises of the **reasoning powers**. The object of 'educational questioning' has been admirably summed up in the following remarks by Dr. Fitch. He says:—'Questioning ought to set the learners thinking, to promote activity and energy on their part, to arouse the whole mental faculty into action instead of blindly cultivating the memory at the expense of the higher intellectual powers. That is the best questioning which best stimulates action on the part of the learner, which gives him a habit of thinking and of enquiring for himself, which tends in great measure to render him independent of his teacher. The success of our teaching must be measured by the degree in which we have strengthened the judgment and enlarged the capacity of our pupils, and imparted to them that searching and enquiring spirit which is a far surer basis for all future acquisition than any amount of mere information.'

(To be continued.)

How a Scotch School was Examined.

Infants.—As this class was not entered specially as an Infant Department no great stress was laid upon their attainments. A short sentence was read by each one from the book professed by each class.

Writing.—One class, the highest, transcribed a line of print, the second wrote a few capital and small letters, and the lowest made some small letters.

Arithmetic.—A good deal of simple mental arithmetic was required in all the combinations, adding, subtracting, multiplying, and dividing. How many articles in a dozen? half-a-dozen? two dozen? How many in a score? half a score? a score and a dozen? &c. How many threepenny books for a sixpence? for a shilling? for ninepence? pay for a sevenpenny book out of a shilling, how much left? Three threes added together? two fours? two sixes?

No singing was taken, though it was enquired into.

The infants were examined in the largest room, while Standards IV., V. and VI. were doing their written work—a most objectionable practice.

Standard I.

Reading.—A number of the boys read from Collins's Improved Series, and the same number of girls read from Chambers's Graduated.

Writing and Arithmetic.—While the half of the others who had not read worked the following sums, the other half transcribed a line from one of the reading books.

Arithmetic read in words, and children placed back to back. Those looking in one direction did Set A, while those looking in the other direction did Set B.

A. (1) 305 + 407 + 90 + 600 + 15.
1,417. Ans.
(2) 987 + 789 + 879 + 999 + 887.
4,541. Ans.
(3) 401 − 195. 206. Ans.

B. (1) 503 + 704 + 19 + 6 + 51.
1,283. Ans.
(2) 769 + 976 + 849 + 567 + 786.
3,947. Ans.
(3) 902 − 607. 295. Ans.

Standard II.

Reading.—The reading books were of the same series as Standard I. One-fourth read from their own set, Collins's Improved, and one-fourth read from the school set, Chambers's Graduated. These were examined with closed books on the lessons read, and asked for verbs, nouns, and adjectives in a desultory style.

Writing.—While the third and fourth wrote the following lines to dictation, the remainder of the class worked the two sets of sums which were given similarly to Standard I.

Dictation.—'Presently two of the birds tried to lift the lame little fellow by seizing his wings in their bills, but that plan would not work.'

Arithmetic.—*A.* (1) 3,709 + 4,008 + 7,984 + 9,876 + 5.986 + 7,295 *(words).* 38,858 Ans.

(2) 7,004 − 309 *(words).* 6,695 Ans.

(3) 2,934,675 − 896,786 *(figures).*
2,037,889 Ans.

(4) 2,997,586 × 6 *(figures).* 17,985,516 Ans.

B. (1) 7,093 + 8,976 + 6,739 + 9,998 + 7,987 + 6,988. 47,781 Ans.

(2) 9,040 − 806. 8,234. Ans.

(3) 2,134,900 − 176,491 (*figures*). 1,958,409. Ans.

(4) 7,532,468 × 4. 30,129,872. Ans.

The music of Standards I. and II. was taken together—one song being asked, and the following modulator exercise given by the Inspector:—

Modulator Exercise:—Key C. **d m s d' l f r t$_1$ r f l s t d' m l m r l m s t d'**

STANDARD II.

Copy books were asked for, and a handful being taken at random, six or seven were minutely looked through.

STANDARD III.

Reading.—This was taken from both sets of books. When one form had read from Collins's Improved Reader, the next read from Chambers's Graduated, and so on alternately till every one had read. The books were then closed and the class tested for intelligence.

Repetition and Grammar were taken together. Each one repeated a few lines of 'The Village Blacksmith.' Along with the meanings of words and phrases, every personal pronoun was taken, in order to find if the pupils knew the noun for which it stood. Simple sentences were selected from the lines by the Inspector, and these were analysed by the scholars.

Geography and History.—The standard was examined on the mountains and rivers of Scotland, and a few of the scholars were taken out in order to be tested on their ability to find places on the map.

In history the examiner began with the battle of Bannockburn, and questioned minutely respecting Bruce, his life and reign. Only a few questions were asked on the life of Mary, but as a semi-voluntary exercise he tried the class on the marriage that led to the union of the Crowns in 1603.

Arithmetic.—Specimen cards.

A. (1) Multiply eighty thousand and seventy-nine by nine thousand five hundred and eight. 761,391,132. Ans.

(2) 152,958,059 ÷ 159. 962,000$\frac{59}{159}$. Ans.

(3) Divide nine hundred and four thousand four hundred and ten by forty-five (factors). 20,098, Ans.

(4) Add together £37 0s. 4½d.; £2 17s. 6d.; £99 9s. 0¼d.; and £19 12s. 3½d. £158 19s. 2¼d. Ans.

B. (1) 239,381,818 ÷ 817. 2,930,001$\frac{1}{817}$. Ans.

(2) Divide eight hundred and eighty-two thousand four hundred and forty-one by sixty-three. 14,007. Ans.

(3) Multiply 730,049 by 3,960. 2,890,994,040. Ans.

(4) Subtract £990 17s. 1¾d. from £8,075 13s. 4d. £7,084 16s. 2¼d. Ans.

Music was taken with Standard IV., and the writing copies were looked through.

STANDARD IV.

Reading.—The boys read from Collins's Readers, and the girls from Nelson's Historical and Geographical Reader. (Before this arrangement was arrived at the examiner took a vote of the class as to which book was the favourite, and the majority chose the latter.) The intelligence was tested from Collins's, and a few questions on grammar and analysis were taken from the same book. The following sentences were to be answered on paper. Analyse the following sentences, parsing the words underlined (italics).

A. In the *evening* a breeze *sprang up* from the sea.

B. After his *defeat* Bruce *found refuge* in the Isle of Rathlin.

Repetition.—One here and there throughout the class had to repeat a few lines from 'The Battle of Morgarten,' but everyone had to answer on meanings and allusions. Particular stress was laid on the 'pronouns,' as in III., and questions given on the geography of Switzerland, as to its people, industries, and appearance, with particular reference to avalanches. Story of 'Tell and the Apple' was alluded to.

History.—Commonwealth; character of Cromwell, success as a general and as a ruler; Charles II.; returning to Montrose's campaigns in Scotland, and some questions on Charles I.

Geography.—Mountains and rivers of England; capes and rivers of Ireland.

Writing.—Copies were looked by sample. Curious test of discipline: the class was told to prepare a page of history while the examiner tested the intelligence of Standard III.

Arithmetic.—

A. (1) Reduce 1,516,680 poles to miles. 4,739 miles 5 fur. Ans.

(2) Multiply £97 2s. 11½d. by 5,068. £492,345 12s. 10d. Ans.

(3) How many half-crowns in seven hundred and thirty thousand and eighty farthings? 6,084. Ans.

4. In 3 qrs. 3 ozs. how many ozs? 1,347 ozs. Ans.

B. (1) Multiply £2 8s. 6½d. by 5, and subtract the result from £204 6s. £192 3s. 3½d. Ans.

(2) Multiply 31 cwts. 1 qr. 3 lbs. by sixty-one. 95 tons 7 cwt. 3 qrs. 15 lbs. Ans.

(3) Divide two hundred and six thousand and fifty pounds eleven shillings and seven pence by three thousand one hundred and twenty-four. £65 19s. 1¾d. Ans.

(4) Reduce 7,643,219 poles to sq. miles. 74 sq. mls. 410 ac. 19 po. Ans.

Standard V.

Reading.—This Standard had two sets of books—Collins's Improved and Nelson's Hist. and Geog. Readers. The reading was taken from the latter.

Writing.—A rather lengthy story about a shipwreck was read twice, and at the same time two sentences were given for analysis, with three or four words to be parsed on paper.

Geography.—Maps of (1) India, (2) Australia, and (3) Spain were given alternately, and when these maps were handed in, with physical features marked, the pupils were asked to indicate the position of three or four important towns.

History.—The cause, incidents, and result of American War of Independence, with special questions on English and American generals and statesmen.

Repetition.—Portion of 'Prisoner of Chillon,' with grammar and syntax of the passage.

Arithmetic.—

A. (1) Multiply the difference of $\frac{1}{15}$ and $\frac{3}{10}$ by $\frac{2}{3}$ of $\frac{3}{7}$.
$\frac{1}{15}$. Ans.

(2) Find by Practice the value of 370 articles at £150 18s. $9\frac{3}{4}$d. each.
£55,848 0s. $7\frac{1}{2}$d. Ans.

(3) Make out and receipt the following bill:—
48 lbs. at 1s. $1\frac{1}{2}$d. per lb.
$11\frac{1}{2}$ lbs. at 1s. 4d. per lb.
62 lbs. at $6\frac{1}{2}$d. per lb.
Milk for 14 days at $3\frac{1}{2}$d. per day.
(£2 14s. + 15s. 4d. + £1 13s. 7d. + 4s. 1d.)
Total, £5 7s. Ans.

(4) Income tax being levied at the rate of £1 7s. 1d. for £100, what is a person's income on which £121 17s. 6d. is paid?
£9,000. Ans.

B. (1) Find the worth of 479 articles at £71 6s. $11\frac{1}{2}$d. each.
£34,175 13s. $0\frac{1}{2}$d. Ans.

(2) Make out and receipt the following bill:—
1,300 penholders at 4d. per score.
84 lead pencils at 9d. per dozen.
47 articles at $2\frac{1}{4}$d. each.
10 boxes at 3d. per box.
(£1 1s. 8d. + 5s. 3d. + 8s. $9\frac{3}{4}$d. + 2s. 6d.)
Total, £1 17s. $2\frac{3}{4}$d. Ans.

(3) Find the dividend on a debt of £626 6s. 3d. of a bankrupt who pays 13s. 4d. in the £.
£417 10s. 10d. Ans.

(4) Divide the sum of $\frac{3}{8}$ and $4\frac{1}{2}$ by $\frac{2}{3}$ × $5\frac{3}{4}$.
$2\frac{5}{23}$. Ans.

Copy-books of Standard V. were also asked for.

Standard VI.

Reading.—This standard read only from Collins's Improved and the examiner was satisfied with one or two sentences from each member of the class.

Grammar and analysis were done on paper, and taken away by the Inspector. The heads of a letter were given, the matter being about a painter who painted from memory the picture of his dead child, and the point of the story was to show that a work done from love was better executed than that which was done for money alone.

Repetition.—This was taken along with Standard V. and examined in exactly the same manner.

Geography.—A list of the Colonies was asked, and a general and then a particular questioning on the Australian Colonies followed. An imaginary voyage round the world from London eastwards and back to London was an interesting feature of this subject.

History.—After a running fire of questions on the whole of their portion from George IV. to the present times, a minute account of the history of the Reform Act of 1832 was asked for.

Arithmetic.—*A.* (1) If the carriage of $5\frac{1}{4}$ cwts. for 25 miles cost 10d., what will it cost to have 21 cwts. 42 lbs. conveyed 63 miles?
8s. $6\frac{3}{5}$d. Ans.

(2) What is the amount in minutes of $\frac{1}{3}$ of 1 week + $\frac{1}{5}$ of a day + $\frac{1}{8}$ of an hour?
$3,655\frac{1}{2}$ min. Ans.

(3) Find the value of $4\frac{1}{4}$ gallons, when the cost of 110·5 gallons is £$3\frac{1}{8}$?
2s. $4\frac{11}{13}$d. Ans.

(4) If the amount of £360 at the end of four years be £540, what is the rate per cent.?
$12\frac{1}{2}$. Ans.

B. (1) A can do a piece of work in $3\frac{1}{7}$ days, B in $4\frac{1}{5}$ days, when will they do it working together?
$1\frac{357}{457}$ days. Ans.

(2) Reduce $4\frac{1}{2}$ roods to the decimal of 24 square inches.
294,030. Ans.

(3) In what time will the interest on £250 amount to £15 12s. 6d., at $2\frac{1}{2}$ per cent.?
$2\frac{1}{2}$ yrs. Ans.

(4) Simplify $\frac{4\frac{1}{2} - {\cdot}05}{{\cdot}0125}$ of £·175.
£62 6s. Ans.

Music.—The Inspector pointed the following exercise on the modulator: (Key C.)—**d s fe s d' t l d' ta l t d' l se l s se l s fe m fe s l m f r d s d' ta l l ta d'**
No ear exercise was given.

Sight-Test.—(Key E.) : .m .f | s .s : s .s }
| s .,m : d .m,d | s_1 .s_1 : s_1,t_1 .r,t_1 | d : .m }
| m .m : m .r | de .d : – .de | r .r : l_1 .l,s }
| f : m,f .m,f | s .,m : d ||

The teachers of Standards III., IV. and V. were asked to correct the work of their own classes.

The registers were tested by the Inspector's assistant, who took one name from every Standard on the Schedules.

Sewing.—First day of Inspection. Three children from Infant Department, and the same number from Standards I. and II. were selected to do specimens of the work set for them in Schedule 3. At the same time the pupil teachers wrought the work allotted to them, as much or as many specimens as they could do in an hour and a half. On the second day, three girls from each of the upper Standards III., IV., V. and VI., were asked to do different portions from the divisions as per Schedule 3.

These specimens were done not in the presence of the Inspector, but in a room apart from the others. The mistress and pupil teachers were allowed to superintend and supply the girls with needles, thread, &c.

Notes of a Lesson on the Planetary System and its General Arrangement.

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INFORMATION TO BE TAUGHT.

A. Revision of Motions of the Earth as a Member of the Solar System.

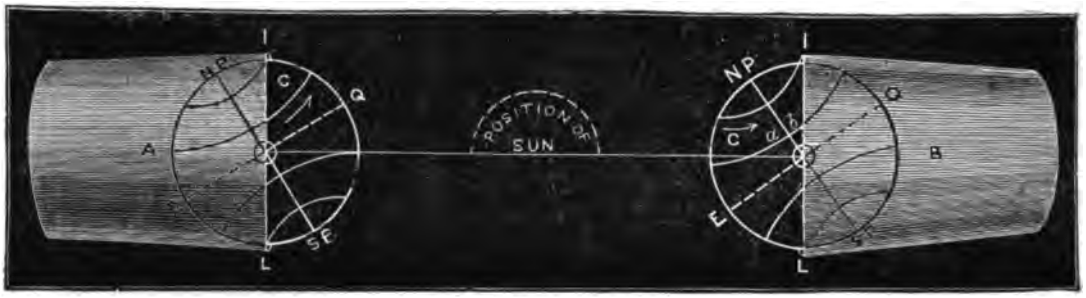
1. That the earth *revolves* round the sun once in each year.

2. That it *rotates* on its axis once a day, thus causing **Day and Night.**

ILLUSTRATIONS AND TEACHING HINTS.

1. The following diagram may be used to represent the earth in two positions with an interval of six months between them.

2. The effect of rotation is best shown by placing a paper cylinder over half the globe, as shown in the diagram, a portion of the earth then rotates in the dark whilst the remaining portion rotates in the light.



3. That its axis is not perpendicular to the plane of its orbit, **but is inclined from the perpendicular 23½°.**

4. That in consequence of its motion of revolution, and the constant direction the axis maintains in space, the earth has four seasons —**Spring, Summer, Autumn and Winter.**

3. This inclination is shown in the diagram.

4. The opposite seasons of winter and summer will be readily recalled by reference to the earth at the winter and summer solstices. (For full explanation see Lesson on Climate in *Practical Teacher*, Vol. VII., No. 9.)

(*a*) The distance of the earth from the sun is so great that it is difficult to impart the notion of it to children. The fastest trains are those running between London and Edinburgh and their average speed is about 54 miles per hour. If now we suppose a train able to travel at an average rate of 60 miles per hour—a mile per minute—and this train to leave our earth in the year 1888 it would arrive at the sun in the year 2063, after rushing along night and day during **175 years.**

B. Points of Comparison between the Earth and some of the other members of the Solar System.

1. Distances from the Sun.

(*a*) The mean distance of the earth from the sun has been carefully calculated, and is estimated to be about **91½ millions of miles.**

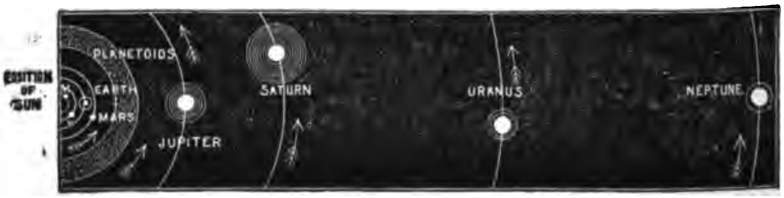


Fig. 2. Illustration of the relative distances of each body in the Solar System from the Sun and from each other.

(*b*) If now we compare the distance of each of the other bodies under consideration with the earth's distance, we get the following approximate results:—

Mercury	·39	Jupiter	5·3
Venus	·72	Saturn	9·5
Earth	1·	Uranus	19·
Mars	1·5	Neptune	30·

The rings round the Earth and some of the other bodies represent the number of moons or satellites. In order to make the relative distances here illustrated more familiar, simple problems like the following should be worked by the class:

If a train travelling 60 miles an hour reaches the sun in 175 years, how long would it take a train to travel over the distance between (*a*) Jupiter and the Sun (*b*) Jupiter and the Earth.

2. Relative size of each member of the Solar System compared with the Earth.

If we reckon the diameter of the earth 8000 miles, and its circumference 25,000, then the length of diameter of each of the other members of the system will be as follows:—

Mercury	·37	Jupiter	10·5
Venus	·9	Saturn	9·
Earth	1·	Uranus	4·
Mars	·6	Neptune	4·5
Sun	107		

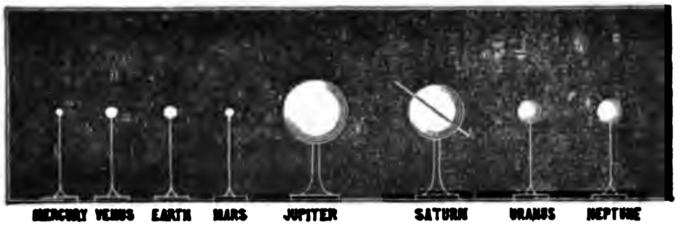


Fig. 3. Diagram of models drawn to scale illustrating the relative sizes of the bodies named.

Firstly, encourage the class to realize the size of the Earth in the same manner as that suggested for obtaining the notion of the Sun's distance. A train would require 17½ days to travel round the earth at the equator, at the rate of 60 miles an hour. Secondly, work out the time required for a similar train to travel round Jupiter, viz., 181·6 days. Then do the same for the other bodies. In this way the size of each heavenly body will be well impressed.

3. Revolution round the Sun and length of Year.

(*a*) By reference to Fig 2 it will be seen that all are there shown to revolve in the same direction round the sun.

(*a*) After referring to diagram 2, it would be well to state that the movements of the system, whether of revolution or of rotation, are all in the same direction, *i.e.*, **from west to east.**

The movement of the satellites of Uranus is an exception

(*b*) The earth's year consists of the time required to make one revolution round the sun; the year of each of the other members of the system is determined in the same way, and is found to be different in every case.

(*b*) The class will know already the first half of the paragraph. Connect the second half with their previous knowledge by simple statement.

(*c*) The lengths of year reckoned in days of our earth are as follows:—

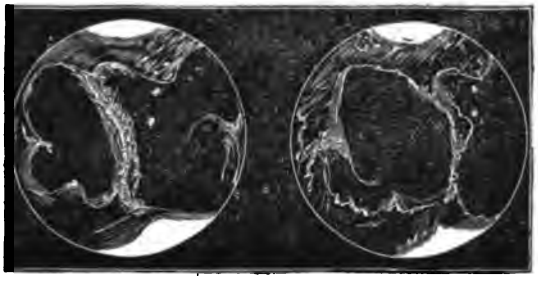
	days of our Earth		days of our Earth
Mercury	88	Jupiter	4,333
Venus	225	Saturn	10,759
Earth	365¼	Uranus	30,687
Mars	687	Neptune	60,127

(*c*) All these figures need not be learned at first. The attention of the class should be drawn (1) to the great difference in the year of those bodies outside of the planetoids from that of those nearer the sun; (2) to the similarity existing between the table of distances and this table, and thus prepare for the establishment of Kepler's 3rd law in future lessons.

4. Rotation and the Length of Day upon each member of the Solar System.

(*a*) *How known to rotate.*—By observing Mars, for instance, it is found that the patches on its surface take different positions at short intervals, and it is inferred that this is due to Mars rotating on its axis.

(*b*) *Similar movements* are observed on other members of the system.



Mars at 6 p.m. Mars at 12 p.m.

Fig. 4. Mars observed after an interval of six hours showing evidence of rotatory movement.

(*c*) *Different rates of rotation.*—These are calculated in hours of earth movement, and are as follows:—

	hours		hours
Mercury	24	Jupiter (nearly)	10
Venus	23½	Saturn	10¼
Earth (nearly)	24	Uranus	12
Mars	24½	Neptune	?

The similarity of the day on the heavenly bodies near the earth will at once be noted, and the great difference between their days and those of the larger bodies must be pointed out.

BLACKBOARD SKETCH.

1. The Earth revolves and rotates; and because its axis is inclined **it has changes of season.**
2. Distance of heavenly bodies shown on the diagram, fig. 2, **Mercury is nearest, and Neptune is farthest away from the Sun.**
3. The size of each is stated in the Table and illustrated by diagram. **The largest next to the Sun is Jupiter.**
4. Each member of the system revolves round the Sun in the same direction. Those furthest away have the longest year. **Neptune has a year almost 165 times as long as that of the Earth.**
5. Each also rotates, and in the same direction as the Earth. Jupiter, the largest of the group of bodies revolving round the Sun, **rotates in the least time, viz., in 10 hours.**

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music.

Teaching Songs.—continued.

75. When the tune is familiar the words should be carefully spoken, with special attention to proper and clear pronunciation. The teacher should say the words a few at a time, the class repeating. When a verse has been repeated it is a good plan to get one or two of the clearest speakers amongst the children to say the words to the other children. Faults of pronunciation that are bad enough in ordinary speech become intensified when they are laid bare by the deliberation of utterance necessitated by the tones dwelt upon in singing. Quite apart from provincial peculiarities against which it is futile to war in singing if they are to be permitted in other lessons and in speech generally, there are common faults that should under no circumstances be tolerated. Among these faults may be mentioned:

1st. The dropping of final consonants. Thus the following words:—

'Then midst our dejection, how sweet to have earned
The blest recollection of kindness returned,'

may come out as—

'Then mist our dejection how swee to have earn
The bles recollection of kiness return.'

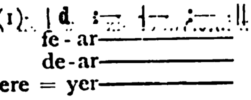
2nd. Saying 'in' for 'ing.'

3rd. Running the end of one word into the beginning of the next.

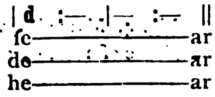
4th. Taking breath in the middle of a word.

5th. Using a wrong vowel in sustained sounds. Thus, singing as at (1) instead of as at (2).

(1)



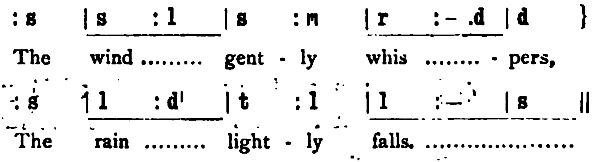
(2)



It is not necessary to go further into the subject here. A teacher can easily observe these and other faults for himself. If he is conscious that in his own speech and singing he has unfortunately contracted bad habits he should seek every assistance obtainable. Only those who have the selection of teachers know to what extent manner and good speech influence choice. Curwen's *Standard Course** provides many excellent studies in pronunciation that go quite as far as any good singer or school teacher need study in this direction.

76. It is not wise in this Division to rely solely upon the pattern teaching described in Sections 74 and 75 to fix tune and words in the memory. The songs so taught should be sung from the blackboard; from printed charts or from books. The eye in this way can be accustomed to notation, and the song can be made to pointedly illustrate the time, tune and ear studies.

77. When, after patterning as described, the class is ready to sing from the written or printed notation, it will still be found necessary to pattern the fitting of the words to the music. The use of the slur-line,


:s |s :l |s :m |r :- .d |d }
The wind .... gent - ly whis .... - pers,
:s |l :d' |t :l |l :— |s ||
The rain .... light - ly falls. ....

which indicates the tones that are to be sung to one syllable, should be made quite clear, and the proper phrasing of the words to bring out the sense should not be left to chance.

78. Finally, the song must be sung with *due expression.* The direct refining influence that may be reached through song cannot be hoped for if children are permitted to sing loudly and coarsely, or without attempting to sing the words with feeling and thoughtful expression. And the influence upon the amusements of after life, which it is hoped the present training of the child's tastes and feelings will exert, cannot reasonably be expected if the beautiful and touching in music is never experienced in

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* Tonic Sol-Fa Agency. Price 3s. 6d.

school. When once the faculties of expression have been aroused in children they are eager to look for the picturesque effects of loud and soft, gay and grave, &c., that are appropriate to the words being sung, and they take only a formal interest in songs that are monotonously drawled through from beginning to end without the slightest attempt at expression. Teachers should make it a point to consider the expression of the songs they teach. Ingenuity and good taste will often discover effects that are not to be found on the surface.

79. From the foregoing it will be obvious that the choice of songs for school use is by no means a slight matter. It is too often the case that songs are chosen for practice in the most fortuitous manner; their fitness for school purposes evidently not being in the least considered. A teacher struck with the prettiness of some song admirably performed with accompaniment at a concert (the words as likely as not dolefully describing the pangs of blighted love) or with some part-song, sung by an adult choral society, forthwith introduces the melody, minus the indispensable harmony, to a class of children, who are said to be not musical if they do not readily take to it. The present writer once heard Weiss's elaborate setting of 'The Village Blacksmith' presented as school music by a large class of boys who could not sing a few notes in tune. The song was sung without accompaniment, the key being taken again and again because of the constant flattening. In this case the choice of music rather than of words was at fault. On another occasion, when taking an eminent musician to an elementary school for the purpose of showing him the condition of music in schools of this type, we were treated to the performance of a difficult chromatic piece in three or four parts, sung atrociously out of tune by a class of boys whose ears we knew were being almost irrecoverably vitiated by the tolerance of false intonation that unfortunately comes of frequent practics of this sort. The motive of teachers in seeking to secure for their pupils the refinement and culture found in the practice of the best music deserves to be commended. The 'school music' offered for choice nowadays is only too often commonplace and weak, and, in turning away from such dull trivialities, teachers are wise. It is obvious, however, that the selection of difficult music never intended and quite unfit for the use of a school class with only moderate attainments, is no gain but rather a hindrance to progress.

80 It should be noted that the Code requirements say that five SCHOOL songs are to be prepared. The description 'school song' covers a wide field of choice. It may include an infants' song and a classical trio for treble and alto voices—'Twinkle, twinkle, little star,' and Rubinstein's duets. Strictly, a school song is one in which the music is tuneful, pretty and easily remembered, thoroughly adapted to the words in accent and feeling, and set to words that afford instruction (without being intrusively didactic) and innocent amusement, and that can be sung at home to parents. Whatever else is taught beside, it should be the teacher's care to see that songs of this type are taught to all the younger children in a school. The choice of all other music of a different type to be studied in *addition* to real school songs is entirely a matter of discretion. The rule should be—choose only that music the class can be fairly expected to master, and that the resources at disposal can perform completely as written by the composer.

81. Children in the third Standard should be taught something of absolute pitch and the pitching of keys. Attention should be drawn to the fact that in the various pieces and exercises that have been practised the key-tone *doh* has been sometimes one sound and sometimes another, higher or lower; and the teacher should inform the children that the time has now come for them to learn the names which are commonly used to describe the various sounds that can be taken for *dohs* or key tones. Much explanation of the difference between absolute pitch and relative pitch is unnecessary at this stage. It will suffice at first for the children to learn that certain sounds are known by letters of the alphabet, that when these sounds are performed in succession they form the familiar tune of the scale, and that the position of a sound in the series is called its PITCH. The alphabetical scale of pitches should be displayed side by side with the scale of sol-fa syllables, and taking care to secure the right pitch for 'C,' the class should be practised in singing up and down the scale, using the alphabetical names until they are learnt by heart.

C^1 **d^1**
B **t**
A **l**
G **s**
F **f**
E **m**
D **r**
C **d**

Unless the teacher is quite assured of his ability to sing 'C' from memory (it is surprising to find so many under delusions in this connection) it is best to give the 'C' from a tuning fork, the sight, and invariable sound of which will help the class to remember what is meant by 'pitch.' When the pitch scale is familiar the class should be practised in pitching keys that fall upon 'natural' (*i.e.* not sharpened or flattened) notes. Suppose 'Key F' (*i.e. doh* to be pitched on F) is to be found. The sound of C^1 is given from the fork and the class sings down the alpabetical scale to 'F'

d^1 C^1 soh
t B / \
l A me me
s G / \
f F doh doh doh doh doh

(knowing the tune to be **d^1 t l s f**) and calling the 'F *doh* several times, sings the chord to 'establish' the key. In pitching keys on this plan it is for some time necessary to sing the *doh* several times before singing the chord, because most of the 'natural' keys (as B, A, E, or D) are really violent and difficult transitions from the key of C just established in the ear by the descending progression. When the *doh* is high in the scale of pitch the *doh* chord should be sung, say as follows:—

d^1 C^1
t B Chord.
l A = doh doh doh. **d m d s_1 d**

82. Other ways of pitching keys, chiefly useful for the teacher at present, but which may be gradually taught in upper Standards, are now described to complete the reference to the subject.

The major keys mostly used in vocal music are:—

C D E F G A (B rarely)
E♭ A♭ B♭

The practised teacher generally quickly finds any of these *dohs* (1) by observing the interval from C to the *pitch* sought for, or, by observing the tone of the scale that C forms in the *key* sought for.

Examples:—

(1) Key E. C^1 to E equals **d^1 m**. Sing **d^1 m**. Call **m**, *doh*
(2) Key A♭. C^1 = me
B♭ = ray
doh = A♭ = doh
Call C^1 *me*, and sing **m r d**

The second plan is the best for the Keys F, B♭, E♭ and A♭, when it can be adopted without uncertainty.

E'				
E'♭			d'	
D'			t	
C'	s	r	l	m
B				
B♭	f	d		r
A	m			
A♭				d
G	r			
F	d			

83. In large schools, where Standards I. and II. are taught separately, a higher proficiency may be demanded from Standard II. than from Standard I. No specific points are mentioned, but it may be expected that great fluency in the work of Standard II., and evidences of preparation for the work of Division III., will naturally be looked for. The points in the work of Division III., that should (if possible) be taught to Standard II., are the following:—

1st. Easy leaps to and from—
ray, *fah*, *lah*, and *te*.
2nd. Three-pulse measure.
3rd. Pulse-and-a-half notes.
(| **d** :- .**d** ||)
TAA - AA TAI
4th. Whole pulse rests.
5th. Written exercises in tune.
6th. Ear tests in naming tones next to one another in scale order.

It will be convenient to deal with these points in the sections given to Division III.

(To be continued.)

Pupil Teachers' Preparation Papers.

The half-yearly examination of pupil teachers will be held on Saturday, October 20th. By the time this magazine is in the hands of subscribers the whole of the year's work should be accomplished, and the six or seven weeks remaining should be spent in careful revision. This should be set about in a systematic way. The time at the disposal of the teacher should be properly divided, and a subject allotted to each division. No part of the work should be delayed, as it may happen that circumstances will arise to prevent the use of the time which may have been fixed for any special work.

We cannot too strongly urge on pupil teachers the necessity of careful definition. Memory work we have found to be often seriously neglected, and the result is a slipshod, inaccurate style in many examination papers. Repeating by rote has many advantages. It compels the learner to give a close attention to what has to be repeated. The memory is strengthened, and the bare facts learned, uninteresting it may be in themselves, may be made the basis of good mental work. It also accustoms the pupil to orderly arrangement of the matter to be used, and a better style of work generally is acquired.

We do not think we can too often reiterate our advice as to obtaining a knowledge of the *rationale* of every process in arithmetic. In fact this is almost the only part of this subject which can be revised, unless a key has been kept of the difficult examples worked during the year. In History, care should be taken to obtain a distinct idea of the effect of actions as seen in the development of future events. The leading events and dates of each period should be learned by heart, while a list of the prominent persons should be made, and a short description of their life and work should be known. For the map drawing exercise, a list of the principal maps with their parallels and meridians should be known. From a good atlas a table in the following fashion should be made out. Thus:—

England: Central meridian 2°. Proceed by ones. 3½ each side. Lowest parallel 50°. Six high.

Ireland: C. M. 8°. By ones. 2½ each side. L. P. 51½. Four high.

It only remains to fix the size of each degree by the usual method, and a map with correct lines of latitude and longitude would be the result. Below we give a test paper based on the pattern of previous government papers. Every pupil teacher should attempt it. It will give familiarity with the amount of work to be done. It will discount the nervousness which more or less attaches to every examination. It will find out weak points and possibly lead to their remedy. It will give practice in making a neat paper, an attainment which every one does not possess. We offer to examine any set of papers and return them free by post, with marks, notes, and comments, if sent to us at the office of *The Practical Teacher*, 4, Pilgrim Street, Ludgate Hill, London, E.C., not later than the 10th September, on receipt of a postal order for one shilling.

TEST PAPERS FOR PUPIL TEACHERS WHO ARE TO BE EXAMINED IN OCTOBER.

Directions.

1. Write on half sheets of foolscap, and on one side only.
2. At the top of each half sheet write your name in full, the full address of your school, and the year the papers of which you are taking.
3. Do not write the questions, but prefix to each answer the number of the question to which it corresponds.
4. Do not use any book or writing from which answers may be copied.
5. Keep strictly to the time allowed.
6. If you have not time to answer all the questions, choose those you can answer best; but do not omit the whole of any one subject.
7. If you wish them examined, corrected, and valued, send them to the office of the 'Practical Teacher,' Pilgrim Street, Ludgate Hill, together with a shilling postal order, not later than the 10th September. They will be returned post free.

END OF FIRST YEAR.

Three and a half hours allowed.

Arithmetic.

(Do three questions only, including question 4, if you can.)

MALES ONLY.

1. Find the L. C. M. of 110, 1,155, and 1,470. How would you show to a class that it was the L. C. M.?

2. What fraction of £1 4s. 6¼d. is 6s. 7¾d., and what decimal of 2 cwt. 3 qrs. 7 lbs. is 1 cwt. 1 qr.?

3. A German 20-mark piece is worth £·979; find to the nearest farthing the value of 3725·39 marks.

4. How would you show to a class by the division of a line that $\frac{3}{4} = \frac{12}{16}$, and that the difference between $\frac{2}{3}$ and $\frac{3}{4}$ is $\frac{1}{12}$?

$$\text{Simplify } \frac{1\frac{1}{8}}{1\frac{3}{14}} \div \left[\left(\frac{9}{17} \times 1\frac{1}{2}\right) - \frac{9}{170}\right].$$

FEMALES ONLY.

1. Find, by practice, the value of 23 tons 6 cwt. 2 qrs. 14 lbs. at £3 13s. 4d. per ton.

2. Make out in proper form and receipt the following bill:—

12 bars of soap, each 3 lbs., at 3½ per lb.; 164 lbs. of tea at 30s. per dozen lbs; 12 packets of candles, each 6½ lbs., at 11½d. per lb.

3. Find the least sum of money which can be paid with an exact number of either sixpences, halfpennies, or dollars (a dollar = 4s. 2d.).

4. Find the G. C. M. of 53,261 and 52,779. Prove that the number you have found is the G. C. M.

Composition.

(The passage is read once by the Inspector, and you are expected to write the substance of it from memory. Read the following once yourself and then write it).

The following instance is related of the practice of economy by a dog. Dandie was a Newfoundland dog belonging to a gentleman in Edinburgh. He frequently had money given him; because, besides other interesting signs of sagacity, he would go to the baker's and buy his own bread. But Dandie received more money than his needs called for, and so he took to hoarding it. This his master discovered in consequence of the dog appearing one day with a breakfast roll when it was known no one had given him money. Search was made in the room where the dog slept, and sevenpence halfpenny was found in his bed, the dog being very excited as the servant approached his hiding place. He did not give up his saving propensities, but found a different place of concealment, and always exhibited a great dislike to the servant who had discovered his first hoard.

Grammar.

MALES AND FEMALES.

(*Answer questions* 1 *and* 2, *and one other question.*)

1. Analyse fully the following passage:—

Yet to their destined *purpose true*,
Undaunted toiled her hardy crew,
Nor looked where shelter *lay*,
Nor *for* Artornish Castle drew,
Nor steered for Aros bay.

2. Parse the words printed in italics.

3. Write out six of the ordinary terminations of English nouns and adjectives, with an example for each.

4. Show that the word *that* may be a relative pronoun, a conjunction, and an adjective; and that the word *but* may be an adverb, a conjunction, or a preposition. Make a sentence for each.

Geography.

(*Answer three questions only.*)

MALES AND FEMALES.

1. Draw a map of Australia, showing the divisions, the mountains, rivers, and chief towns.

2. Describe as fully as you can the physical characteristics of Wales.

3. Name the commercial ports of the British empire, and say what are the chief exports of each.

4. What do you know of Leeds, Sheffield, Portsmouth, Limerick, Cork, Perth, Inverness, Sydney, and Hobart Town?

History.

(*Answer two questions only.*)

1. What advantages did England derive from its occupation by the Romans and Saxons respectively?

2. Give a list of the Saxon kings from Egbert to Harold, with dates.

3. Write an account of the incursions of the Danes, or of the rise of the power of Wessex.

END OF SECOND YEAR.

FIRST PAPER.

Three and a half hours allowed.

Euclid.

MALES ONLY.

[All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operation*, such as −, +, ×.]

(*Answer two questions, including Question* 3, *if you can do so.*)

1. If from the ends of a side of a triangle there be drawn two straight lines to a point within the triangle, these two straight lines shall be together less than the other two sides of the triangle, but shall contain a greater angle.

2. The greater angle of every triangle is subtended by the greater side, or has the greater side opposite to it.

3. Define a *triangle;* show how many kinds of triangles there are according to the variation both of the angles and of the sides. In the diagram of Euclid, I., 21, by how much does the greater angle, BDC, exceed the less, BAC.

Arithmetic.

FEMALES ONLY.

(*Answer three questions only, including the last if you can.*)

1. What is a *measure*, a *common measure*, the *greatest common measure*? Find the G. C. M. of 8,214, 1,110, and 1702.

2. If I pay away ⅔ of my money, and then ⁴⁄₇ of what is left, what fraction of the whole is left?

3. Reduce 4½ oz. Troy to the fraction of 5 lbs. Troy, and ⅐ of ⅜ of £4 10s. to the fraction of ⅔ of ⅓ of £1 12s. 6d.

4. What is a decimal fraction? Show as you would to a class how to convert ⅐ and ⅓ to decimal fractions. How would you explain the reason of each of these forming a recurring decimal?

Grammar.

(*Answer questions* 1 *and* 2, *and one other question.*)

MALES AND FEMALES.

1.
Our outward life requires them not;
Then wherefore had they birth?
To minister delight to man,
To beautify the earth;

To comfort man, to whisper hope
Whene'er his faith is *dim;*
For *Who* so careth for the flowers
Will much more care for him.

Express, in your own words, the meaning of the above verses on 'Flowers.'

2. Analyse them.

3. Parse the words in italics.

4. Give the meaning of the following words, dividing them if you can into *prefix*, *root*, and *affix*, with the signification of each:—Extraction, concession, purify, nonsense, satisfaction, prelude.

Geography.

MALES AND FEMALES.

(*Answer three questions only, including the last if you can.*)

1. What are the principal towns in British India? Give as full an account as you can of the trade between India and our own country.

2. Draw, with meridians and parallels if you can, a full map of France or of Turkey. In the latter show the alterations which have been made in its area since 1854.

3. Place in order the names of the six countries in Europe with which we do the most trade, and state in each case of what the export and import trade consists.

4. Where and what are the following:—Buda-Pesth, Lyons, The Matterhorn, Snaehatten, Nijni-Novgorod, Astrakhan, Galatz, Metz.

5. Define *latitude* and *longitude*. State the difference in time between a place in 15° W. long. and one 4½° E. long., and in climate between a place 15° N. and one 50° N.

SECOND PAPER.

Two hours and a half allowed.

(One hour allowed to females for needlework, while males are engaged with arithmetic.)

Arithmetic.

MALES ONLY.

(Answer three questions only, including the last if you can.)

1. A banker charged 3½ per cent. on a bill for £666 13s. 4d., drawn March 2nd at eight months, and discounted on the 8th of June. Find the difference between his charge and true discount.

2. A person has £26,041 of a four per cent. stock. He saves each year a fourth of his income and invests it at 4 per cent. What is his income in the fourth year?

3. If 2 roods 15 per. cost £39 7s. 6d., what will 8 acres 17 per. cost?

4. Explain the terms *Interest*, *Profit and Loss*, and *Stock*, and find the price of the 4 per cents. when £4,680 produces £180.

History.

(Answer three questions.)

1. What effect had the Norman Invasion on the habits, manners, government, and language of Britain?

2. Write as fully as you can an account of the political circumstances which led to the Reformation in England.

3. What was the Feudal System? Trace its history. *Or*, write an account of Magna Charta and its chief provisions.

4. State what events are connected with three of the following places:—Worcester, Halidon Hill, Evesham, Berwick, Hedgely Moor, Hexham; also give a short account of three of the following persons:—Pym, Simon de Montfort, Warwick, Lambert Simnel, Odo, Owen Glendower.

Teaching.

(Answer two questions only.)

1. How many lines are needed in a single copy to teach young children with the greatest ease the forms, proportions, and the method of joining letters? Rule a specimen, and write the word *bicuspid* in it.

2. State the method you have used in correcting mistakes in reading. How have you endeavoured to secure expressive and intelligent reading? If you have read to the class yourself state your reasons for doing so.

3. How do you teach spelling (*a*) to infants, *or* (*b*) to the older scholars? What are the various advantages attached to your method?

END OF THIRD YEAR.

FIRST PAPER.

Three and a half hours allowed.

Euclid.

MALES ONLY.

(Answer two questions, including question 3, if you can do so.)

1. To describe a square on a given finite straight line.

2. To a straight line to apply a parallelogram which shall be equal to a given rectilineal figure, and having one of its angles equal to a given rectilineal angle.

3. Show how to divide a square into four equal portions by lines drawn from any point in one of its sides.

Algebra.

(Answer three questions, including question 4, if you can do so.)

1. How would you explain to a class the method of subtraction in algebra. From $x + 2y + 4z$ take $-3x + y - z$, as an example.

2. Express algebraically that if $a - b$ be divided by the square of $4a^7 b^3$, the quotient is x; and simplify $\frac{\frac{1}{11} m^3 n^4 x^9}{\frac{1}{55} m^2 n^5 x^3}$

3. Form expressions for x by removing brackets, and simplifying the following:—

$$x = [(a - \sqrt{ab} + b)(a + \sqrt{ab} + b)] - (a^{\frac{3}{4}} + b^{\frac{3}{4}})$$
$$(a^{\frac{1}{2}} - a^{\frac{1}{4}} b^{\frac{1}{4}} + b^{\frac{1}{2}})$$

4. If $l + m = n$, show that $m^2 - n^2 + 2\,bm + b^2 = 0$, and solve the equation:—

$$\frac{4x - 15}{x - 3\frac{1}{2}} + \frac{10x - 8}{2x - 2} = \frac{8x - 26}{2x - 6} + \frac{5x - 1\frac{1}{2}}{x - \frac{1}{2}}$$

Mensuration.

(Answer one question.)

1. The base of a triangle is 14 inches, and its height 18 inches. What is the area of the triangle? The area of another triangle is 81 square inches, and its base 36 inches. What is the height of the triangle?

2. What would be the area of a square sheet of paper if two corners were cut off, making the sides 12, 7½, 9, 5, 5½, and 5¼ inches long respectively, when the length of the perpendicular drawn from the centre to each of the sides is 6 inches long?

Arithmetic.

FEMALES ONLY.

(Answer three questions only, including the last if you can.)

1. Simplify $(5{\cdot}634 \times {\cdot}0057) + \left(\frac{4{\cdot}2325}{8465} \div \frac{{\cdot}39424}{5632}\right)$

2. Reduce ⅜ of 21s. to the decimal of £1.

3. A person, after paying 7d. in the pound income tax, has £349 10s. left. What was his gross income?

4. How do you explain to a class the meaning of a recurring decimal? Show, in decimals, the difference between ⅐ and ⅛.

Grammar.

MALES AND FEMALES.

(Answer three questions only.)

1. *Be* not *deceived*; *if* I *have veiled* my look,
I turn the trouble of my countenance
Merely upon myself. *Vexed* I am
Of *late* with passions of some difference,
Conceptions only proper to myself,
But *let* not therefore my good friends *be grieved*—
Among which number, Cassius, *be* you *one*—
Nor construe any further my neglect,
Than that poor Brutus, with himself at war,
Forgets the shows of love to *other* men.

Paraphrase the above passage from a speech of Brutus in Shakespeare's 'Julius Cæsar.'

2. Parse the words in italics.

3. Analyse the first six lines.

4. Arrange the words of the lines in three divisions.—English, Latin, and Other Languages—and give the roots, prefixes and affixes of the Latin words.

Geography.

MALES AND FEMALES.

(Answer three questions only, including the last, if you can.)

1. What are the chief products, divisions, rivers and towns of Siberia?

2. Write as full an account as you can of Japan.

3. Where are the following, and for what are they noted:—Mandalay, Tonquin, Hong Kong, Tokio, Jeddah, Mecca, Suez, Pietermaritzburg, Nyassa, Kimberley?

4. What is the Gulf Stream? Trace its origin, course and effects. Name also the chief currents found in the ocean.

SECOND PAPER.

(Two hours and a half allowed.)

[One hour allowed to Females for Needlework while Males work Arithmetic.]

Arithmetic.

MALES ONLY.

(Answer three questions only, including the last, if you can.)

1. The area of a square garden is 4 roods 1 per. 29 yds. 6¾ ft.; find the length of a side.

2. A sum of £50,000 for drainage purposes has to be raised from four townships A, B, C, D. A is rated at £175,002, B is rated at £82,434, C is rated at £22,116, and D is rated at £204,448. How much in the £ must the rate be, and what will each township have to pay?

3. If sugar can be bought at £3 14s. per cwt. how must it be sold to gain 12½ per cent., after allowing a discount of 7½ per cent.?

4. Explain the meaning of *Stock*. The difference between the incomes derived from investing a certain sum in 5 per cent. stock at 127, and in 5½ per cent. stock at 135 is £4 14s. Find the amount invested and the income resulting from each.

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. Give in order, with dates, the principal events connected with the War of American Independence.

2. What led to the Union of the Parliaments of England and Scotland? State as fully as you can the advantages derived by each country from the Union.

3. Write a short account of three of the following:—Warren Hastings, the Duke of Wellington, Tippoo Saib, Lord Clive, Richard Cromwell, General Havelock.

4. Say what you know of the Corn Laws, and mention any other fiscal reforms of the present reign.

Teaching.

MALES AND FEMALES.

(*Answer two questions only.*)

1. Write out notes of a lesson on one of the following subjects: (*a*, for older scholars) Winds; (*b*, for infants) The Ox.

2. What are the principal groups of facts you would teach to the Third Standard in Geography? On which would you lay most stress, and why?

3. Give a list of the varied occupations you employ in the Infant School and say what advantage you expect the children to derive from them.

4. What illustrations do you use to show the various uses of the verb?

END OF FOURTH YEAR.

FIRST PAPER.

(*Three and a half hours allowed.*)

Euclid.

MALES ONLY.

[All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operation* as +, –, ×.]

(*Answer two questions only, including No. 3 if you can*).

1. In obtuse angled triangles, if a perpendicular be drawn from either of the acute angles to the opposite side produced, the square on the side subtending the obtuse angle is greater than the squares on the sides containing the acute angles by twice the rectangle contained by the side upon which, when produced, the perpendicular falls, and the straight line intercepted between the perpendicular and the obtuse angle.

2. To describe a square that shall be equal to a given rectilineal figure.

3. Prove geometrically that if a straight line be trisected the square on the whole line equals nine times the square on a third part of it.

Algebra.

(*Answer three questions, including* 1 *and* 4 *if you can.*)

1. Find the G.C.M. of $4a^2 + 8 + \frac{4}{a^2}$, $a^2 - \frac{1}{a^2}$, $a^2 + 1 + \frac{3}{a} + 3a$.

Find the L.C.M. of $120x^3 + 78x^2 - 45x - 27$, $120x^3 + 98x^2 - 42x - 36$, and $20x^2 + 3x - 9$.

2. Express in its simplest form—

$$\left[\left(1 + \frac{b^2}{a^2}\right)^2 - \left(1 - \frac{b^2}{a^2}\right)^2\right]^{\frac{1}{2}} - b + \frac{b\,(a^2 - 1)}{a^2\left(1 + \frac{1}{a}\right)}$$

3. Find the square root of $a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$.

4. Solve the equations:—

$$(a)\quad x^2 + \sqrt{x^2 - 5} = 11.$$

$$(b)\quad \begin{aligned} 4xy &= a^2 - b^2. \\ 2\,(x^2 + y^2) &= a^2 + b^2. \end{aligned}$$

Mensuration.

(*Answer one question.*)

1. The area of a circular plot of grass is 100 square yards; find the area of the inscribed square.

2. The two parallel chords of a zone are 16 and 12, and their perpendicular distance is 2; what is the area of the zone.

Arithmetic.

FEMALES ONLY.

(*Answer three questions.*)

1. How should I affect my income by selling out from the 1¾ per cents. at 47¼, and investing in the 3¼ at 99?

2. A pays £9 3s. 4d. more rates than B though their incomes are the same: living in different towns they are rated at 2s. and 1s. 4d. in the £ respectively; what is their income?

3. In gunpowder 75 parts by weight are saltpetre, 10 parts sulphur, and 15 parts charcoal. How many pounds weight of each ingredient are used in the manufacture of 16 cwt. of gunpowder?

4. A gallon of water weighs 10 lbs., and a cubic foot of water weighs 1,000 ozs.; how many gallons are there in a cubic foot.

Grammar.

MALES AND FEMALES.

(*Answer questions 1 and 4, and one other question.*)

1. *But yesterday* the word of Cæsar *might*
Have stood against the world; now lies he here,
And *none so poor to do him reverence.*
O masters! *if* I were disposed to stir
Your hearts and minds to mutiny and rage,
I should do Brutus *wrong*, and Cassius wrong,
Which you all know are honourable men;
I will not do them wrong: I rather choose
To wrong the dead, to wrong myself and you,
Than I will wrong such honourable men.

Express in your own words the meaning of the above passage.

2. Pick out the Latin words and give their meaning and derivation.

3. Analyse the first six lines.

4. Parse the words in italics.

5. Write a short life of Shakespeare, Milton, Locke, Bacon, Sir Walter Scott, Byron, or Burns, and give a list of the works of any one of the others.

Geography.

MALES AND FEMALES.

(*Answer three questions.*)

1. Write what you know about the sun under the following heads: Size, position, surface, its revolution, its spots.

2. What do you know about the climate of various parts of America?

3. Define the terms: Zenith, nadir, horizon, aphelion, perihelion, planet, asteroids, solstice, equinox.

4. State as many particulars as you can about Cairo, Valparaiso, Lima, Cotopaxi, Monte Video, St. Louis, Chicago, Adrianople, Varna, Sydney.

SECOND PAPER.

(*Two hours and a half allowed.*)

[One hour allowed to Females for Needlework while Males are engaged with Arithmetic.]

Arithmetic.

MALES ONLY.

(*Answer three questions.*)

1. A monkey, climbing up a greased pole, ascends three feet and slips down 2 feet in alternate seconds until he reaches the top of the pole. If the pole be 60 feet high, how long will it take him to reach the top?

2. During a distillation the fluid that comes over in 3 consecutive hours contains 53, 50, and 48 per cent. of alcohol respectively. The rates at which it comes over during these three hours are in the ratios of 1, 2, and 3. What is the percentage of alcohol in the whole mixture?

3. Find the difference between the present values of £808 10s. due 2 years hence, according as simple or compound interest is reckoned, money being worth 5 per cent.

4. A man buys eggs at a certain price per score and sells them at half that price per doz.; what is his gain or loss per cent.?

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. Name with dates the chief events of Victoria's reign.
2. Give an account of the various Reform Bills of this century, and state the changes they have effected.
3. What historical events are connected with the following places :—Utrecht, Bunker's Hill, Crecy, Hastings, Worcester, Dunbar, Waterloo, Ramilies, Quebec ?
4. Who were the chief writers of Elizabeth's reign ? What period is spoken of as the 'Augustan age of English Literature'? Why ?

Teaching.

MALES AND FEMALES.

(*Answer two questions only.*)

1. Write full notes of a lesson on one of the following :—
   (*a*) The Cotton Plant.
   (*b*) English Fruit Trees.
   (*c*) The Moods of Verbs.
   (*d*) For Infants.—A Country Walk.
   (*e*) For Infants.—The Herring.
2. Give a list of the combinations of letters which present difficulty to a child owing to their varied pronunciation in different words. Give specimen words.
3. Show how you teach subtraction to young children.
4. For what purpose do you give Object Lessons ? State the various kinds of lessons you give for developing the various faculties of a child.

Tests in Mental Arithmetic.

STANDARD I.

1. What are 4 plus 5 plus 6 ? 15. Ans.

2. What is the half of 15 ? 7½. Ans.

3. Take twice six from three times seven. 9. Ans.

4. If I give 6 boys 8 apples each, how many shall I give away ? 48. Ans.

5. How much would they cost at 4 a penny ? 1s. Ans.

6. $8 \times 5 - 30$. 10. Ans.

7. How many boots make 7 pairs ? 14. Ans.

8. What does fourteen mean ? Four and ten. Ans.

9. How many quarters can I get from 5 apples ? 20. Ans.

10. I had a score of apples, and gave a dozen away; how many had I left ? 8. Ans.

11. A boy had 30 nuts: to how many of his playmates could he give 4 each ? 7. Ans.

12. How many would he have left ? 2. Ans.

13. How many penny books can I get for 2s. 2d. ? 26. Ans.

14. Which of these two figures represents the larger number ? 2. Ans.

15. Find the cost of 3 pounds of sugar at 2½d. per pound. 7½d. Ans.

16. What change would you receive out of a shilling ? 4½d. Ans.

17. How many pounds of sugar at 3d. a pound can I get for 1s. 6d. ? 6. Ans.

18. What is the difference between six sixpences and half-a-crown ? 6d. Ans.

19. What gold coin can you get for two crowns ? Half-a-sovereign. Ans.

20. Find the cost of a pound and a half of beef at 9d. a pound. 1s. 1½d. Ans.

STANDARD II.

1. What is the quarter of 7, 8, and 9 ? 6. Ans.

2. A butcher has 2 score sheep; he sells 15 and kills 11; how many has he left ? 14. Ans.

3. There are 8 desks and 7 boys in a desk; how many boys are there altogether ? 56. Ans.

4. How many boys will be left after 3 rows have been dismissed ? 35. Ans.
(Note.—5 rows of 7 each would be left).

5. I give 7 boys 7 marbles each, and have one left; how many had I at first ? 50. Ans.

6. $17 + 5 \div 11 \times 9 - 4 \div 7$. 2. Ans.

7. There are 20 rooks in a tree; a farmer shoots a quarter of them; how many are left ? 15. Ans.

8. What do you call the number which is made up of nine tens ? Ninety. Ans.

9. How many shillings are equal to 90 pence ? 7½. Ans.

10. How many twopenny buns can you get for 7s. 6d. ? 45. Ans.

11. What is the cost of half-a-dozen oranges at two for 1½d. ? 4½d. Ans.

12. How many farthings is that ? 18. Ans.

13. Find the cost of 7 lbs. of bacon at 8d. a pound. 4s. 8d. Ans.

14. What change would be received out of a sovereign ? 15s. 4d. Ans.

15. How many ounces are there in a pound-and-a-half of beef ? 24. Ans.

16. How many days are there in September ? 30. Ans.

17. If a boy save a penny a day what will he save in a month ? 2s. 4d. Ans.

18. How many minutes are there in an hour-and-a-half ? 90. Ans.

19. Find the price of half-a-pound of tea at half-a-crown a pound. Give the answer in farthings. 60. Ans.

20. How many walnuts at 8 a penny could you get for 8½d. ? 68. Ans.

STANDARD III.

1. What is ten times 75 ? 750. Ans.

2. How many more is required to make a thousand ? 250. Ans.

3. What is the amount of a thousand farthings ? £1 0s. 10d. Ans.

4. How many apples must be cut up to give 26 girls a quarter each ? 7. Ans.

5. What part of an apple would be left ? ½. Ans.

6. How old is a boy this year who was born in 1879 ? 9 years. Ans.

7. What is the half of half-a-guinea? 5s. 3d. Ans.

8. How many pence are there in half-a-guinea? 126. Ans.

9. Which of these figures represents the largest number? 1. Ans.

10. What would 5 dozen apples cost at a halfpenny each? 2s. 6d. Ans.

11. From £5 take 7 times 5s. £3 5s. Ans.

12. Find the price of 4½ lbs. of mutton at 10d. a pound. 3s. 9d. Ans.

13. What is the cost of $\frac{3}{4}$ lb. of butter at 1s. 8d. a pound? 1s. 3d. Ans.

14. Take 1s. 3d. from half-a-sovereign. 8s. 9d. Ans.

15. A person bought 80 eggs at 1s. 3d. a score; how much did they cost? 5s. Ans.

16. Find the cost of a gallon of milk at 2d. a pint. 1s. 4d. Ans.

17. How many hours are there in a week? 168. Ans.

18. How many days are there in 2 years? 730. Ans.

19. If a boy earn sixpence every day, how much will he get for the month of September? 15s. Ans.

20. What is the cost of 3 stone of potatoes at a penny a pound? 3s. 6d. Ans.

STANDARD IV.

1. How many less than a hundred is 4 times 19? 24. Ans.

2. Divide 200 nuts equally among 17 boys and 23 girls; how many is that for each? 5. Ans.

3. I bought 7 lbs. of butter at 1s. 3d. per lb., and sold it at 1s. 8d.; how much did I gain? 2s. 11d. Ans.

4. Find the cost of 9 lbs. of beef at 9½d. per lb. 8s. 1½d. Ans.

5. What change would be received out of a sovereign? 11s. 10½d. Ans.

6. How many half-crown hats can be bought for £3 12s. 6d.? 29. Ans.

7. How much is $\frac{4}{5}$ of a sovereign? 16s. Ans.

8. What change would you get out of a crown after buying 16 eggs at 1s. 6d. a dozen? 3s Ans.

9. A horse runs a mile in 3 minutes; how far could it go in an hour and a quarter at the same rate? 25 miles. Ans.

10. How many minutes has a boy been over his sums who takes from 2.45 to 3.25? 40. Ans.

11. Find the price of 3 gross of buttons at 4½d. per dozen. 13s. 6d. Ans.

12. What part of a foot is half-an-inch. $\frac{1}{24}$. Ans.

13. If I run 220 yards in a minute, how long will it take to run a mile? 8 minutes. Ans.

14. How many stone are there in half-a-cwt.? 4. Ans.

15. What is the cost of a cwt. of sugar at 3d. a pound? £1 8s. Ans.

16. Divide the quarter of £1 8s. among 16 boys; how much is that for each? 5¼d. Ans.

17. If two ounces of pepper cost 3½d., what does it cost a pound? 2s. 4d. Ans.

18. If seven sheep cost £21, what will 5 cost? £15. Ans.

19. What is the area of a ceiling in square yards, which is 15 ft. long and 12 ft. broad? 20. Ans.

20. What would it cost whitewashing at a halfpenny a square foot? 7s. 6d. Ans.

STANDARD V.

1. Take the square of 9 from the square of 10. 19. Ans.

2. What is the G.C.M. of 72 and 96? 24. Ans.

3. Find the L.C.M. of 2, 3, 4, 5, and 6. 60. Ans.

4. Which is greater, $\frac{1}{6}$ or $\frac{1}{7}$? $\frac{1}{6}$. Ans.

5. What is the difference? $\frac{1}{42}$. Ans.

6. Take $\frac{1}{3}$ from $\frac{3}{4}$. $\frac{5}{12}$. Ans.

7. What fraction of a florin is 8d.? $\frac{1}{3}$. Ans.

8. I give 16 girls a third of an apple each; how many apples must I cut up? 6. Ans.

9. How much should I have left? $\frac{2}{3}$. Ans.

10. How many twelfths are there in $\frac{2}{3}$? 8. Ans.

11. After spending $\frac{5}{7}$ of my money, what fraction have I left? $\frac{2}{7}$. Ans.

12. If I have half-a-crown left, how much had I at first? 8s. 9d. Ans.

13. What is the difference between $\frac{3}{5}$ of half-a-crown and $\frac{5}{6}$ of a florin? 2d. Ans.

14. Find the cost of 3 tons 5 cwt. at 10s. a ton. £1 12s. 6d. Ans.

15. If 9 horses are worth £225, how many horses could I get for £100? 4. Ans.

16. If 6 horses plough a field in five days, how long will it take 4 horses? 7½ days. Ans.

17. Find the simple interest on £200 for 3 years at 4 per cent. £24. Ans.

18. What is the simple interest on £450 at 3½ per cent. for 2 years? £31 10s. Ans.

19. I bought a horse for £50, and sold it to gain 50 per cent.; how much did I get for it? £75. Ans.

20. A piano, which cost £30, was sold at a loss of 20 per cent.; what was received for it? £24. Ans.

STANDARDS VI. AND VII.

1. I give $\frac{1}{3}$ of an apple to Harry, $\frac{1}{5}$ to John, and the rest to Will; what is Will's share? $\frac{7}{15}$. Ans.

2. How many tenths are there in 13$\frac{3}{5}$? 136. Ans.

3. Which is greater, ·5 or ·35? ·5. Ans.

4. What is the difference? ·15. Ans.

5. What vulgar fraction is equal to this decimal? $\frac{3}{20}$. Ans.

6. Which is greater, ·47 or ·470? Both alike. Ans.

7. What is the difference between ·4 and $\cdot\dot{4}$? $\cdot 0\dot{4}$. Ans.

8. Express the difference as a vulgar fraction in its lowest terms. $\frac{2}{45}$. Ans.

9. Multiply ·0705 by 100. 7·05. Ans.

10. Find the value of ·975 of £1.
19s. 6d. Ans.

11. What is the value of $\dot{4}2857\dot{1}$ of half-a-guinea?
4s. 6d. Ans.

12. What decimal of a shilling is 7½d.?
·625. Ans.

13. Find the simple interest on £250 for 6 months at 2½ per cent.
£3 2s. 6d. Ans.

14. What is 5 per cent. on £567 8s. 9d.
£28 7s. 5¼d. Ans.

15. An agent is paid 5 per cent. commission, and receives £14 9s. 6d.; how much has he collected?
£289 10s. Ans.

16. In what time will a sum of money double itself at 4 per cent.?
25 years. Ans.

17. What is the area of a square room in square yards, which is 60 ft. round?
25. Ans.

18. If I bought a knife for 9d., and sold it for 1s., what did I gain per cent.?
33⅓. Ans.

19. If I bought it for 1s., and sold it for 9d., what did I lose per cent.?
25. Ans.

20. In a school of 450 children 96 per cent. passed in reading; how many failed?
18. Ans.

London University Matriculation.

THE following new instructions respecting the mode of entry for the matriculation examination in the University of London will be read with great interest by those of our readers who intend to pass that examination.

The registrar gives notice that in view of the rapidly increasing number of candidates for the examinations of the university, all candidates for matriculation will henceforth be required to comply with the following instructions:—

1. Not less than five weeks before the commencement of the examination every candidate must apply to the registrar by letter for a *Form of Entry*, which, together with all particulars respecting the arrangements of the examination, will be sent to him immediately on receipt of the application.

2. This form, duly filled up, must be returned to the registrar *not less than four weeks* before the commencement of the examination, and with it, *in the same cover*, must be sent (*a*) the candidate's *certificate of age*, and (*b*) his fee for the examination.

No candidate's name will be placed on the list of candidates unless his *form of entry, certificate of age, and fee* shall have been received at the university *on or before the fourth* Monday before the commencement of the examination.

As soon as possible after the closing of the list, and not previously, each candidate's certificate and fee will be acknowledged, his certificate will be returned, and a number, by which he is to be designated throughout the examination, will be assigned to him.

EXAMINERS IN THE UNIVERSITY OF LONDON, 1888.

Latin.—Prof. R. Y. Tyrrell, D.Lit., LL.D., and Prof. A. S. Wilkins, Litt.D., LL.D.

Greek.—Rev. H. A. Holden, LL.D., M.A., and Rev. W. Wayte, M.A.

English.—Prof. E. Arber, and Henry Craik, Esq., M.A.

French.—Rev. E. Brette, B.D., and A. Esclangon, Esq.

German.—Prof. Buchheim, Ph.D., and Herman Hager, Ph.D.

Mental and Moral Science.—Prof. Adamson, LL.D., and Prof. Knight, M.A.

Political Economy.—Prof. C. E. Bastable, M.A., and Prof. I. S. Nicholson, D.Sc., M.A.

Physics.—Prof. FitzGerald, M.A., F.R.S., and R. T. Glazebrook, M.A.

Chemistry.—Prof. J. E. Reynolds, M.D., and Prof. W. A. Tilden, D.Sc.

Mathematics.—Prof. M. J. M. Hill, M.A., and J. Larmor, M.A., D.Sc.

Botany.—Prof. O. Bower, M.A., and Prof. H. M. Ward, M.A.

Zoology.—Prof. E. Ray Lankester, M.A., and Adam Sedgwick, M.A.

Geology.—Prof. T. G. Bonney, D.Sc., and Prof. W. Boyd Dawkins, M.A.

Physiology.—Prof. J. N. Langley, M.A., and Prof. Schäfer.

Publications Received.

Bell, G., and Sons—
Greek Testament Selections. By A. M. M. Stedman, M.A.
The Building of the British Isles. By A. J. Jukes-Browne, B.A., F.G.S.
The Cambridge Texts, with Notes:—
Virgil's Æneid, Books 1 & 2.
" Georgics, Books 1 and 2, 3 and 4.
" Bucolics.
Ovid's Fasti, Books 1 and 2, 3 and 4.

Blackie and Son—
Earth Knowledge. Part II. By W. Jerome Harrison and H. Rowland Wakefield.
Whisk and Buzz. By Mrs. A. H. Garlick.
Ablett's Drawing Series for the Standards.

Chambers, W. and R.—
Our Animal Friends.

Curwen, J., and Sons—
The School Music Teacher. By John Evans and W. G. McNaught.
The Call to Song. By J. Evans and A. L. Cowley.

Educational Supply Association, The—
Twelve Rules for helping English people to remember French Genders.

Heywood, John—
Lamb's Tales from Shakespeare. By A. Gardiner.
Second Grade Perspective, Parts 11 and 12. By G. O. Blacker.

Hirschfeld Bros.
Hossfeld's New Method for Learning the Spanish Language. By Tomas Enrique Gurrin.

Marcus Ward & Co.—
The Oriel Geographical Reader. Standard II.

National Society, The—
A Summary of the Final Report of the Royal Commission, 1886—1888. By E. Herbert Lyon.

Nelson, T., and Sons—
The Royal Star Arithmetic Cards. Standards I. to VII.
The Royal Upper Class Readers—Great Authors.

Sonnenschein and Co.—
The Cyclopædia of Education. Parts 6 and 7.

Query Column.

RULES.

1. **Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.**

2. **No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.**

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

⁂ All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.*

Algebra.

1. J. D. M.—Prove that

$$C_1 - \frac{C_2}{2} + \frac{C_3}{3} - \ldots + (-1)^{n+1}\frac{C_n}{n}$$
$$= 1 + \tfrac{1}{2} + \tfrac{1}{3} + \ldots + \frac{1}{n}.$$

Let $d_1, d_2, d_3, \ldots d_n$ represent the first differences of the series

$$1 + \tfrac{1}{2} + \tfrac{1}{3} + \ldots + \frac{1}{n};$$

$$d_1 = -\tfrac{1}{2};$$
$$d_2 = \frac{1.2}{1.2.3} = \tfrac{1}{3};$$
$$d_3 = -\frac{1.2.3}{1.2.3.4} = -\tfrac{1}{4};$$

&c., &c.

$$d_{n-1} = (-1)^{n+1}\frac{1.2.3\ldots(n-1)}{1.2.3\ldots n}$$
$$= (-1)^{n+1}\frac{1}{n}.$$

The $(n + 1)$th term of series

$$0,\ 1,\ (1 + \tfrac{1}{2}),\ (1 + \tfrac{1}{2} + \tfrac{1}{3}), \ldots \left(1 + \tfrac{1}{2} + \tfrac{1}{3} + \ldots + \frac{1}{n}\right)$$

is the sum of $1, \tfrac{1}{2}, \tfrac{1}{3}, \ldots \frac{1}{n}$.

The first order of differences of

$$0,\ 1,\ (1 + \tfrac{1}{2}),\ (1 + \tfrac{1}{2} + \tfrac{1}{3}), \ldots \left(1 + \tfrac{1}{2} + \tfrac{1}{3} + \ldots + \frac{1}{n}\right)$$

is the series $1, \tfrac{1}{2}, \tfrac{1}{3}, \ldots \frac{1}{n}$;

If $D_1, D_2, D_3, \ldots D_n$ represent the first differences of the above series,

$$\therefore D_2 = d_1,\ D_3 = d_2, \ldots D_n = d_{n-1};$$

The $(n + 1)$th term of the above series, putting a for first term

$$= a + D_1 n + D_2\frac{n(n-1)}{1.2} + D_3\frac{n(n-1)(n-2)}{1.2.3} + \ldots$$
$$+ D_{n-1} n + D_n$$

$$\left(\text{But } a = 0,\ D_1 = 1,\ D_2 = d_1 = -\tfrac{1}{2},\ D_3 = d_2 = \tfrac{1}{3}, \ldots D_n = d_{n-1} = (-1)^{n+1}\frac{1}{n}\right)$$

$$= n - \frac{n(n-1)}{1.2}\times\tfrac{1}{2} + \frac{n(n-1)(n-2)}{1.2.3}\times\tfrac{1}{3}$$
$$- \ldots + (-1)^{n+1}\frac{1}{n}$$
$$= C_1 - C_2\times\tfrac{1}{2} + C_3\times\tfrac{1}{3} - \ldots$$
$$+ (-1)^{n+1}C_n\times\frac{1}{n};$$

$$\therefore C_1 - \frac{C_2}{2} + \frac{C_3}{3} - \ldots + (-1)^{n+1}\frac{C_n}{n}$$
$$= 1 + \tfrac{1}{2} + \tfrac{1}{3} + \ldots + \frac{1}{n}.$$

Q. E. D.

2. 4th YEAR P. T.—From each of a number of gold coins a person filed a fifth part, and had passed ⅗ of them, gaining thereby 52s. 6d., when the rest were seized as light coin, except one with which the man decamped, having lost on the whole $\tfrac{4}{3}$ as much as he had gained before; how many coins were there at first?

Gain on each coin passed = $\tfrac{1}{5}$ of its value,
Loss " " seized = $\tfrac{4}{5}$ " ;

$$\therefore \left(\frac{2x}{5} - 1\right)\times\tfrac{4}{5} = (1 + \tfrac{4}{3})\left(\frac{3x}{5}\times\tfrac{1}{5}\right)$$
$$\frac{4(2x-5)}{25} = \tfrac{7}{3}\times\frac{3x}{25}$$
$$= \frac{7x}{25}$$
$$8x - 20 = 7x$$
$$8x - 7x = 20$$
$$\therefore x = 20.$$

$\therefore$ No. of coins = 20. Ans.

3. FELIX.—Given $\dfrac{a^2x}{1 - a\sqrt{x}} = \dfrac{a}{\sqrt{x}} + \dfrac{1}{1 - a\sqrt{x}}$, to find value of x.

$$\frac{a^2x}{1 - a\sqrt{x}} = \frac{a}{\sqrt{x}} + \frac{1}{1 - a\sqrt{x}}$$
$$-\frac{a}{\sqrt{x}} = \frac{1 - a^2x}{1 - a\sqrt{x}}$$
$$= \frac{(1 + a\sqrt{x})(1 - a\sqrt{x})}{1 - a\sqrt{x}}$$
$$= 1 + a\sqrt{x}$$
$$-a = \sqrt{x} + ax$$
$$ax + \sqrt{x} = -a$$
$$x + \frac{\sqrt{x}}{a} = -1$$
$$x + \frac{\sqrt{x}}{a} + \left(\frac{1}{2a}\right)^2 = \frac{1}{4a^2} - 1$$
$$= \frac{1 - 4a^2}{4a^2}$$
$$\sqrt{x} + \frac{1}{2a} = \frac{\pm\sqrt{1 - 4a^2}}{2a}$$
$$\sqrt{x} = \frac{\pm\sqrt{1 - 4a^2} - 1}{2a}$$
$$\therefore x = \left\{\frac{\pm\sqrt{1 - 4a^2} - 1}{2a}\right\}^2.$$

$$\text{Or, } x = \frac{1 - 4a^2 \pm 2\sqrt{1 - 4a^2} + 1}{4a^2}$$
$$= \frac{2 - 4a^2 \pm 2\sqrt{1 - 4a^2}}{4a^2}$$
$$= \frac{(1 - 2a^2) \pm \sqrt{1 - 4a^2}}{2a^2}.$$

4. **W. MASTERS.**—A banker gives £410 15s. cash for a bill; his profit is 1s. 4d. Find the true discount on the bill.

Present worth of bill = £410 15s. + 1s. 4d.
= £410 16s. 4d.;

Discount = Interest on Present Worth,

And, Difference between Discount and Interest = Interest on Discount.

Let x = Interest on £1 in fraction of a pound for the given time at the given rate,

$$\text{Then, } 410\tfrac{49}{60} \times x \times x = \tfrac{1}{15}$$
$$24649x^2 = 4$$
$$157x = 2$$
$$\therefore x = \tfrac{2}{157}.$$

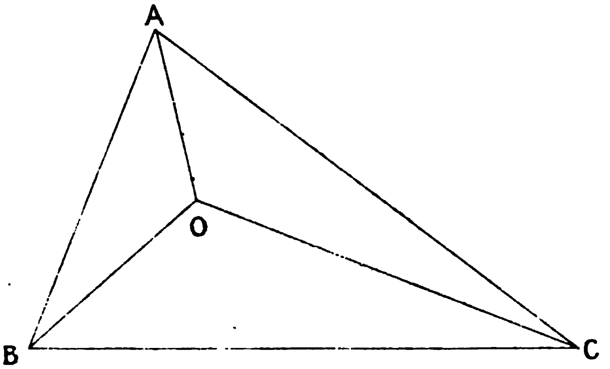
$$\therefore \text{Discount} = (410\tfrac{49}{60} \times \tfrac{2}{157})£$$
$$= \left(\frac{24649}{\underset{30}{\cancel{60}}} \times \frac{\cancel{2}}{157}\right)£$$
$$= \tfrac{157}{30}£$$
$$= \underline{£5\ 4s.\ 8d.}\quad \text{Ans.}$$

Trigonometry.

1. **WILTSHIRE YOKEL.**—If a point be taken within a triangle so that the sides subtend equal angles at it, and α, β, γ be the distances of this point from the angular points of the triangle, show that

$$a^2 + b^2 + c^2 = 2(\alpha^2 + \beta^2 + \gamma^2) + \frac{4 \text{ area of triangle}}{\sqrt{3}}.$$

(*Todhunter's* 'Trigonometry for Beginners.')



Let ABC denote the triangle, and O the point within it.

Then the angles AOB, BOC, COA are all equal, so that each is 120°.

Let OA = α, OB = β, OC = γ.

$$\text{Then, } BC^2 = BO^2 + CO^2 - 2BO \,.\, CO \cos 120^\circ,$$
$$\text{That is, } a^2 = \beta^2 + \gamma^2 + \beta\gamma;$$
$$\text{Similarly, } b^2 = \gamma^2 + \alpha^2 + \gamma\alpha,$$
$$\text{And, } c^2 = \alpha^2 + \beta^2 + \alpha\beta;$$

∴ By addition,

$$a^2 + b^2 + c^2 = 2(\alpha^2 + \beta^2 + \gamma^2) + \alpha\beta + \beta\gamma + \gamma\alpha.$$

$$\text{Now, area of triangle BOC} = \tfrac{1}{2}\beta\gamma \sin 120^\circ$$
$$= \frac{\beta\gamma\sqrt{3}}{4};$$

$$\text{Similarly, area of triangle COA} = \frac{\gamma\alpha\sqrt{3}}{4},$$

$$\text{And, ,, ,, AOB} = \frac{\alpha\beta\sqrt{3}}{4};$$

Hence, by addition,

$$\text{Area of triangle ABC} = (\alpha\beta + \beta\gamma + \gamma\alpha)\frac{\sqrt{3}}{4},$$

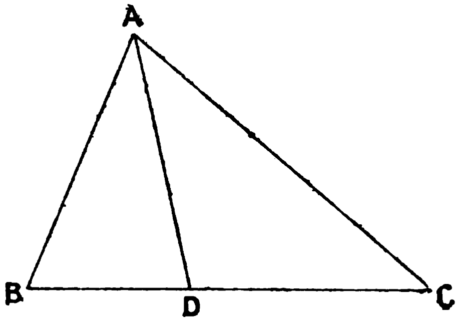
$$\therefore \alpha\beta + \beta\gamma + \gamma\alpha = \frac{4}{\sqrt{3}}\text{area of triangle ABC.}$$

Wherefore,

$$a^2 + b^2 + c^2 = 2(\alpha^2 + \beta^2 + \gamma^2) + \frac{4 \text{ area of triangle}}{\sqrt{3}}.$$

2. **WILTSHIRE YOKEL.**—Show that the length of the straight line drawn to bisect the angle A of a triangle, and terminated by the opposite side is $\frac{2bc \cos \frac{1}{2} A}{b + c}$.

(*Todhunter's* 'Trigonometry for Beginners.')



In the triangle ABC let AD bisect the angle BAC.

$$\text{Then, area of triangle BAD} = \tfrac{1}{2}\text{BA}\,.\,\text{AD} \sin \text{BAD}$$
$$= \tfrac{1}{2}c\,.\,\text{AD} \sin \tfrac{1}{2}\text{A};$$
$$\text{Similarly, area of triangle CAD} = \tfrac{1}{2}b\,.\,\text{AD} \sin \tfrac{1}{2}\text{A};$$

Hence, by addition,

$$\tfrac{1}{2}\text{AD}(b + c)\sin\tfrac{1}{2}\text{A} = \text{area of triangle ABC}$$
$$= \tfrac{1}{2}bc \sin \text{A}$$
$$= bc \sin \tfrac{1}{2}\text{A} \cos \tfrac{1}{2}\text{A},$$
$$\therefore \text{AD} = \frac{2bc \cos \frac{1}{2}\text{A}}{b + c}.$$

Note.—Please refer to Rule 1 of Query Column.

Arithmetic.

1. **ANNIE LINDSAY.**—Two houses are built by two sets of men in days which are in the ratio of 20 : 27. If each set had worked the same number of hours per day, the ratio would have been 2 : 3. If each had been built by the other set of men working as they actually did the ratio would have been 108 : 125. If 30 men were employed on the first who worked 9 hours a day, how many were employed on the second and how many hours a day did they work? (*Marlborough Arithmetic.*)

(1) Time for 1st house : Time for 2nd house
:: No. of men in 1st set × No. of hours per day × 20
: No. of men in 2nd set × No. of hours per day × 27.

(2) Time for 1st house : Time for 2nd house
:: Number of men in 1st set × 2
: Number of men in 2nd set × 3.

(3) Time for 1st house : Time for 2nd house
:: No. of men in 2nd set × No. of hours per day × 108
: No. of men in 1st set × No. of hours per day × 125.

Let M stand for number of men in 2nd set, and H for number of hours they work per day.

(α) No. of men in 1st set × No. of hours per day × 20
: No. of men in 2nd set × No. of hours per day × 27
:: No. of men in 1st set × 2
: No. of men in 2nd set × 3;

$$\therefore \cancel{30} \times \cancel{9} \times \underset{10}{\cancel{20}} : M \times H \times \underset{3}{\cancel{27}} :: \cancel{30} \times \cancel{2} : M \times \cancel{3}$$
$$10\,M = M \times H$$
$$\therefore H = 10.$$

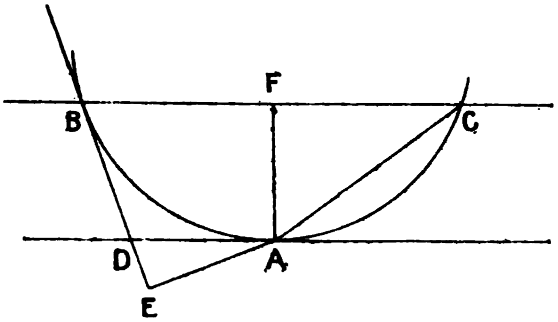
(β) No. of men in 1st set × 2 : No. of men in 2nd set × 3
:: No. of men in 2nd set × No. of hours per day × 108
: No. of men in 1st set × No. of hours per day × 125;

$$\therefore \cancel{30} \times \cancel{2} : M \times \cancel{3} :: M \times \cancel{10} \times \underset{\underset{6}{\cancel{12}}}{\cancel{108}} : \underset{5}{\cancel{30}} \times \cancel{9} \times 125$$
$$M \times M = 625$$
$$\therefore M = \sqrt{625}$$
$$= 25.$$

$$\therefore \left.\begin{array}{l}\text{Number of men in 2nd set} = 25\\ \text{Number of hours per day} = 10.\end{array}\right\}$$

Geometry.

1. A STUDENT.—A series of circles touch a fixed straight line at a fixed point; show that the tangents at the points where they cut a parallel fixed straight line all touch a fixed circle? (*Todhunter.*)



Let A be the fixed point in the fixed straight line.

Let a circle which touches the fixed straight line at A cut the fixed parallel straight line at B and C.

Draw a tangent to this circle at B, and let it meet the fixed straight line at D.

Draw AE perpendicular to BD produced, and AF perpendicular to BC. Join AB, AC.

Proof.—$\angle$ DBA = $\angle$ ACB, (III. 32.)
And $\angle$ ABC = $\angle$ ACB, (I. 4.)
because AF passes through the centre (III. 19), and consequenily bisects BC (III. 3).

$$\therefore \angle \text{DBA} = \angle \text{ABC}. \quad (\text{Ax. 1.})$$

Hence in the two triangles ABE, ABF,
The side AB is common,

$$\angle \text{ABE} = \angle \text{DBA},$$
$$\text{And } \angle \text{AEB} = \angle \text{AFB}, \ (\text{Ax. 11.})$$
$$\therefore \text{AE} = \text{AF}. \quad (\text{I. 26.})$$

Hence the straight line through B will touch at E the circle described from A as centre with radius equal to the fixed length AF.

Similarly the tangent at C to the circle will touch the same fixed circle.

In the same manner it can be demonstrated that the tangents to any other circle, which touches the fixed straight line at A, at the points where it cuts the fixed parallel straight line, will touch the same fixed circle.

Q. E. D.

General.

1. MECHANIC.—One pound of lead (S.G. 11) is tied to a piece of cork (S.G. ·22), and when they are put in water, one-half of the cork is immersed.

How much does the cork weigh? (*Blackie's* 'Mechanics.')

$$\frac{\text{Weight of lead}}{11} + \frac{\tfrac{1}{2}\text{ weight of cork}}{\cdot 22}$$
$$= \text{Weight of water displaced};$$

If W represent weight of cork in lbs.,

$$\text{Then, } \frac{1 \text{ lb.}}{11} + \frac{\tfrac{1}{2}\text{ W lbs.}}{\cdot 22} = (1 + \text{W}) \text{ lbs.}$$

$$\frac{1}{11} + \frac{25\text{ W}}{11} = 1 + \text{W}$$
$$1 + 25\text{ W} = 11 + 11\text{ W}$$
$$25\text{ W} - 11\text{ W} = 11 - 1$$
$$14\text{ W} = 10$$
$$\therefore \text{W} = \tfrac{5}{7}.$$
$$\therefore \text{Weight of cork} = \tfrac{5}{7} \text{ lb.}$$

2. EIGHTEEN.—We must compliment you upon your excellent writing. Your book list is very good. Wrigley's 'Mathematical Problems' is a capital book. You can get a secondhand copy for a few shillings. Perhaps the best recent book on Mechanism is Professor Kennedy's 'Principles of Mechanism,' Macmillan and Co. If you want to study Conic Sections analytically, get C. Smith's 'Conic Sections,' Macmillan, 7s. 6d.

3. PLYMOUTH.—Have you read the new regulations? If so you will have noticed the importance attached to blackboard. Study that branch of the work and apply for permission to take that subject at a training college.

4. NANT.—The book you name is a good one. But you must remember that the enunciations given at Christmas will be nearly in the words used by Potts and Todhunter. Hence, if you are not familiar with them, you may not recognise them, and if you fail to identify the propositions you cannot prove them. As to symbols, refer to the subject of Euclid in this magazine for this month, page 333. You must observe the instructions on the paper given you.

5. MATER.—Any stage except the 1st and 2nd. Choose the one you prefer, and we will then recommend books.

6. SEE WHY.—We suppose you mean the subjects in Latin and Greek if you take it. You do not expect us to print the Syllabus. For January, 1889, the Latin subject is 'Sallust's Conspiracy of Catiline.' For June, 1889, the Latin subject is Vergil's Æneid, Books I. and II. For January, 1889, the Greek subject is Homer's Iliad, Book VI. For June, 1889, the Greek subject is Cyropædia, Book V. For a detailed Syllabus, write to the Registrar, Burlington House, Piccadilly, W.

7. CHICK.—We believe you can. Make application and enquire.

8. CARIAD.—The large hand is the worst. The curves badly shaped, down straight strokes uneven, and here and there bent. The slant is uniform and correct. Writing shows promise. 70 per cent. Small hand is bold and legible. It only lacks smoothness, elegance. Try good ink and a suitable pen. 85 per cent.

9. W.R.S.—Undoubtedly the best books for your purpose are C. Smith's 'Conic Sections,' Macmillan, 7s. 6d., and Williamson's 'Differential Calculus,' Longman and Co., 10s. 6d. They may seem hard at first, but they are quite within your capacity. The remainder will be given next month.

Science Notes.

THE Duke of Argyll in a letter to *Nature* has called attention to what are called functionless organs. Organic Nature is, he says, full of structures which are either wholly or partly functionless. Sometimes they are called aborted, sometimes degenerated, sometimes rudimentary, sometimes representative. But under whatever name the Darwinian philosophy almost invariably explains them as structures or parts of structures which must have once been useful and have become functionless by atrophy or disuse; they are interpreted as relics of a past in which they were useful, never as utilities which are yet to be. I have often thought, says the duke, that if the doctrine of development be true functionless organs must be, as often as not, the germs of potential use and not necessarily at all the remains of past actual use, organs in the process of being built up for the discharge of a very definite and peculiar function, a function for which they are not yet fit or but very imperfectly fitted. Such a view if true would not tell against development or evolution, but it would tell and tell fatally against the element of fortuity which is inseparable from the idea of natural selection.

In reply to the duke Professor E. Ray Lankester states as a result of the progress of the doctrine of evolution for a quarter of a century that the origin of species by natural selection in the struggle for existence is everywhere being more completely demonstrated by reasoning and observation. Mr J. T. Hurst asks if we are to expect that the coccyx is prophetic of a tail to the human family or that the time is approaching when the rudimentary covering of hair on the human body will develop into a warm coat similar to that of the bear or the beaver.

The great volcanic eruption in Krakataŏ in 1883 can hardly be yet forgotten. Before the eruption the island was covered with luxuriant vegetation, all trace of which was obliterated by that alarming event. Dr. M. Tent has just published an account of his visit to the island. It is pretty certain that all vegetable life must have been destroyed in the island. Most surprising therefore is it to learn that at the present time a very considerable vegetation has sprung up, eleven species of ferns were collected. Examination showed that fresh water Algæ had covered the pumice stone and cinders and thus prepared the ground for the ferns much as they prepare a soil in which flowering plants will germinate and thrive. Beside ferns there were found many plants which are known to appear very soon on recently raised coral islands. The rapidity with which the vegetable life of the island has been renewed is most striking and instructive.

⁂

From time to time testimony continues to be borne to the increasing importance of the study of physics. Sometimes it is on account of the educational value of it, sometimes it is because it is essential to the correct understanding of many other sciences. The Science and Art Department has only recently decided to issue a new and more general syllabus for elementary students. Professor Gardiner in an address to the British Medical Association gave utterance to a remarkably strong opinion as to the value of physics to the medical practitioner. We quote an extract from his speech, 'When we consider,' he said, 'how completely modern science has demonstrated the subordination of living bodies and physiological processes, not to a wholly detatched set of laws termed vital, but to all the most elementary laws of matter; and further the correlation of all the physical forces throughout the universe, so that the living body and its environment act and react upon each other throughout infinite space and time, it will be readily admitted, I think, that some kind of systematised instruction in physics, and not a mere elementary examination in mechanics, should be an essential part of an education with a view to the medical profession. And when we further consider that most of the great advances in medical diagnoses in the present day through the stethoscope, microscope, laryngoscope, ophthalmoscope, sphygmograph, and electrcity as applied to muscle and nerve, involve applications of pure physics which are neither remote from practice, nor yet to be easily mastered by the beginner, and that in the case of electricity and other physical reagents, even heat and cold, we are every day extending the domain of these sciences in therapeutics and still more perhaps in preventive medicine and sanitary science, their claim for an extended recognition in teaching seems to be enormously enhanced. I am persuaded that in a very few years the physical laboratory will become an absolutely essential preliminary step in the education of the physician of the future, and that those who have not undergone this training will be hopelessly distanced in the race."

⁂

Sir Philip Magnus reports that in the present year there has been a large increase in the total number of candidates examined for the certificates in technology. In 1887, 5508 were examined, of whom 3090 passed, in 1888, 6166 were examined, of whom 3510 passed. Examinations have been held this year in 49 subjects. The subjects in which the least number of candidates presented themselves are those connected with the chemical industries, and the examiners in these subjects generally remark that few of the candidates are found to possess that combined knowledge of scientific principles and of technical processes which is desirable. The increase in the number of candidates has been most marked in cloth, cotton, linen, and jute manufacture, carpentry, masonry, and brickwork. The average percentage of failure has fallen from 43·8 to 43·1 °/o, and from the separate reports of the examiners it appears that in most subjects there is improvement in the candidates' written answers and practical work. It is anticipated that with the establishment of technological institutions in different parts of London there will be a great increase in the number of candidates for examination.

Publications Reviewed.

Royal Standard Readers. The Boy makes the Man. For Standard VI. London: T. Nelson and Sons.

This volume forms a fitting conclusion to Messrs. Nelson's latest series of reading books for the Standards. Its contents consist largely of biographical sketches, illustrating the boyhood and manhood of eminent men, such as Nelson, Livingstone, Lincoln, Garfield, Dr. Johnson, and West. Moral teaching is thus given in its most attractive form—the exhibition of examples. Interspersed with the narrative lessons are others consisting of striking quotations from great writers, and a selection of spirited poems and songs. Helps to understand the lessons and exercises in word-making and grammar are given in the lavish manner characteristic of similar works from the same publishers.

The Encyclopædia of Education. (Parts I. to VII.) London: Swan, Sonnenschein, Lowry, and Co.

With what satisfaction and hope does the teacher of to-day take up a work like this. When called upon to pronounce with authority upon any one of the modern and manifold developments of the art he professes he will now, he trusts, be able to arm himself with a fulness and accuracy of information worthy his position, and the knowledge for which the world gives him credit. Alas for human aspirations! we do not hesitate to say that in this case many of the teacher's hopes at least will be doomed to disappointment.

The articles on 'Health in School' are clever, they are up to date, and are applied to the conditions of school life in such a way as to render them of great practical value; those on the various laws of mental science are extremely well done from their purely psychological side, but surely some serious attempt should be made at their application to the actual life and work of the school. In a comparatively new science there is need of abundance of examples; here, however, whilst the generalities of mental science are admirably stated, there is little or no attempt to bring them into living and organic connection with the methods and discipline of the school. If the work be tested by the light and guidance it yields upon the newest development of English education—that of manual instruction—it falls far short of expectancy. An article of little more than a page in extent is devoted to this subject, and is for the most part culled from American reports; the only references to work of this kind in England are to the workshops at Clifton, Oxford, Cambridge, and Uppingham, and these are dismissed in half-a-dozen lines. No mention is made of the institution at Bradford, with its thousand students, and that in connection with the City Guilds, of the work long conducted at King's College, Dulwich and Finsbury Colleges, and the Polytechnic in London, at Newcastle, Nottingham, and Birmingham. The fact that more than 200 teachers of various grades attended lectures and took part in the demonstration at one London centre during the past year, and that the work has assumed a tangible form under the direction of the London School Board, should find place in any account of manual instruction in England. The article reminds us of some educationists in England who, as soon as the subject of teaching is mentioned, air their knowledge of education abroad in order to hide their ignorance of what is being done at home. We notice frequently that the relative importance of topics is not nicely balanced; for example, the article on 'Schools of the Middle Ages' takes up more than three times the space allowed the article on 'Middle Class Schools;' again, the article on Mnemonics is longer than the article on Memory. The works for further reference mentioned under many of the articles will be found of great practical service to teachers of all grades.

In the later issues we find a short and reliable account of the life and work of Pestalozzi, an article on 'Punctuation,' twice the length of the article following on 'Punishment,' and a capital account (unfinished) of the 'Renaissance in its relation to Education.' The article on 'Reading' is remarkable for the abundance of its quotations from the writings of educationists from Locke to Bain, and the reader is left in the midst of doctrines and theories of the most conflicting kind with the slightest of guidance from the author. We could wish the notion of M. Renan that Christ was taught on the *Simultaneous System* had been omitted. It serves no purpose as an authoritative opinion on the teaching of reading, and its introduction is flippant if not irreverent.

First Elements of Experimental Geometry.
By Paul Bert. Translated from the French. London: Cassell and Company, Limited.

Every teacher under the Code is acquainted with the note at the foot of Schedule IV. which says, 'it is intended that the instruction in the science subjects shall be given mainly by experiment and illustration.' And almost every teacher knows that it is useless in the race for percentages to attempt to prepare for an examination through these means either solely or chiefly. We have no doubt many teachers also have again and again thought how little application could be made of the mass of definitions and tricks taught for a pass in more than one of the science subjects. Great outcry has of late been made respecting technical education, and its commencement in our elementary schools. So long as it remains an inducement to pass an examination by the payment of so much per pass, so long will bastard methods of instruction be continued. Once, however, assure managers and teachers that they will not have to suffer pecuniarily by the adoption of good methods, and those methods will at once come into use. It is generally admitted that drawing, and especially geometry, is a valuable aid to practical knowledge in after life. But the learning of a mass of definitions and the ability to draw figures is generally the sum of all the knowledge most of our boys get. Here, however, is a book before us which gives definitions only as new figures are introduced, and which makes a practical application of every fact which it is found necessary to teach. In a series of forty-four short lessons, the pupil by remarkably easy stages is made acquainted with lines, surfaces, solids and angles, and the methods of calculating lengths, areas and contents, besides learning how to draw geometrical figures and plans, and how to apply this knowledge to surveying. It is certain that a new era would dawn upon our educational world if such books as those of Paul Bert were generally used in our schools. We are quite sure that a pupil who had mastered this little book would be infinitely better prepared for service as a mechanic than nine-tenths of those who go through the usual lessons in geometrical drawing in our schools. The translator has done his work thoroughly well, while the printers, by good type, chaste binding, and the use of the original illustrations, have done their best in supplying a thoroughly practical manual. A series of questions on each lesson adds largely to the value of the book.

Our Animal Friends.
London and Edinburgh: W. and R. Chambers.

Messrs. Chambers have added a handsome volume with the above title to their list of gift books. It abounds with stories of the horse, dog, cat, and elephant. These are arranged to show the various characteristics of the animals, and the qualities which they develop. Thus we have stories describing the personal attachment, fidelity, educability, and sagacity of the dog; the affection, courage, memory, and intelligence of the cat; the courage, revenge, obstinacy, and docility of the horse; and the employment, obedience, gratitude, revenge, &c., of the elephant. The book is neatly got up, well illustrated, and its perusal must produce a good effect on the mind of the reader, kindness to animals being inculcated in almost every descriptive page.

Horn's (a) Geography of the British Empire; (b) Geography of the Five Continents; (c) Grammar and Geography for Third Standard.
Manchester: John Heywood.

These are cheap and generally accurate little summaries of the geography of the various parts of the world, suitable for memory work for the various standards. The two marked (a) and (b) may be had together in cloth. Standard III. has lessons in Grammar as well as Geography.

(a) The Standard Arithmetic.
By Ebenezer L. Jones.

(b) The New Graded Arithmetic.
By C. H. Wykes. Manchester: John Heywood.

A new and revised edition of (a) is now being published. Part II., under notice, contains a large collection of questions on every kind of British weights and measures, necessary and unnecessary to be taught in our schools.

Part VI. of (b) is intended for Standard VI., and contains nearly nine hundred graduated questions for one penny.

Donald's Hamper.
By A. J. Foxwell and C. H. Lewis.

Prairie Life.
By A. J. Foxwell. London: J. Curwen and Sons.

These are two little Operettas or Cantatas for school use. The music is easy and cheerful, and may be attempted in any schools where the children sing in two or more parts.

New Songs for English Schools.
By H. Kreuz. London: G. Gill and Sons.

This little work contains 25 capital songs in two and three parts; and, being printed in both notations, it is admirably suited to the wants of teachers and the requirements of the New Code.

The Infant Action Song and Recitation Book
By Mrs. Hibbert. London: J. Marshall and Co.

We are pleased to call the attention of the readers of the *Practical Teacher* to Part IV. of this little work, which fully sustains and supplements the excellent practical features of the preceding parts.

A misprint on page 108, last score, 3rd bar, in the tenor, gives rise to some ugly consecutives.

Arithmetic Drill Sheets for Infants. London and Edinburgh: T. Nelson and Sons.

A very serviceable addition to the apparatus of an Infant School. Five large sheets of tough parchment paper are mounted on a roller and printed in two colours, the first with names, numbers and dots of the ten numerals; the others—two with little exercises in addition up to tens, and the other with subtraction sums of the same kind, one of each having answers and the other being without. They will save time, and will give the familiarity with these exercises necessary to ensure rapid and correct mental work. They are executed in the best style of this well-known Edinburgh House, and the price is reasonable.

Musical Terms; a short Dictionary. By A. Kennedy, M.A., &c. London: J. Curwen and Sons.

This is a cheap and convenient Dictionary, arranged somewhat in the style of Stainer and Barrett's 'Musical Terms' in Novello's Series of Primers. The addition of the pronunciation of all difficult words renders this little book extremely valuable to musical students, and especially to those who have not the opportunity of studying more expensive and elaborate works.

Royal Star Arithmethic Cards. Seven Packets. Standards I.—VII. Edinburgh: T. Nelson and Sons.

These packets each contain thirty-six cards of Inspector's Test Sums, with six mental arithmetic sums printed on the opposite side of each card. The sums, both tests and mental, are practical, and the answers may be relied upon. The cards are of thin, but tough and durable, parchment paper.

HIGH COURT OF JUSTICE.

CHANCERY DIVISION.

(Before Mr. Justice NORTH.)

HUGHES *v.* CHAPMAN AND HALL, LIMITED.

On Friday, July 27th, Mr. Cookson-Crackenthorpe, Q.C.—with whom was Mr. G. Benson Clough—moved on behalf of Mr. Joseph Hughes, Pilgrim Street, Ludgate Hill, for an interim injunction to restrain the defendants, Messrs. Chapman & Hall, Limited, publishers, of Henrietta Street, Covent Garden, from issuing any further copies of a work entitled 'Mechanical and Experimental Chemistry,' by Dr. Edward B. Aveling. This book was neither more nor less than a pirated edition (errors included) of a work issued by the plaintiff in 1886, entitled *Dr. Aveling's Chemistry of the Non-Metallics.*

The defendants on having the fact drawn to their attention were willing to treat the motion as the trial of the action, and submit to a perpetual injunction. Upon the plaintiff waiving his claim to damages they also undertook to pay all costs, including costs as between solicitor and client.

Mr. Justice North accordingly granted a perpetual injunction in the terms asked.

Owing to pressure on our space we are compelled to hold over until next issue the following papers:—'Model Essay,' 'Practical Needlework in Elementary Schools,' the 'School Song,' as well as several Reviews.

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OTHER VOLUMES TO FOLLOW.

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Practical Teacher
A MONTHLY EDUCATIONAL JOURNAL.
Edited by JOSEPH HUGHES.

'Knowledge is proud that he has learned so much,
Wisdom is humble that he knows no more.'—COWPER.

VOL. VIII. No. 8. OCTOBER, 1888. {PRICE, 6D. POST FREE, 7½D.

Pestalozzi.

BY THE REV. CANON WARBURTON, M.A.,

Formerly Her Majesty's Inspector of Training Colleges for Schoolmistresses.

CHAPTER VI.—*continued.*

It was, indeed, a rare combination of gifts! The famous writers on education who preceded him had been, for the most part, philosophers and theorists, and had left to others the practical task of carrying their principles into effect. His own master, Rousseau, after elaborating a scheme for the education of an imaginary son, 'Emile,'* in such affectionate and touching detail, had allowed his own children to be brought up in a foundling hospital. Pestalozzi's strength lay in the two extremes—in an instinctive knowledge of the way by which to win the confidence and the affections of the individual child, and in deep and far-reaching research into the scientific principles of intellectual and moral culture. To revert to our illustration of the architect, Pestalozzi may indeed be said to have understood the composition of a brick and the way to handle it,—in planning lofty and enduring thought-edifices, he was in his element still; but between moulding bricks and designing palaces there lies a whole region of practical activity, skill, and knowledge requisite for success, and in this region he was no better than an old woman or a child. We have his own confession that 'in spite of his grand ideals embracing the destinies of the whole human race, he did not possess the knowledge and ability requisite for conducting a village school.'† His life was therefore a succession of failures and disappointments, notwithstanding his rare natural endowments and his single-hearted devotion to the highest and most unselfish objects.

It is important to bear in mind the causes of Pestalozzi's ill-success as a schoolmaster, because that ill-success has brought discredit on his system, and given rise to the idea that it is unsound, or at the best, unpractical—a charge which is sufficiently refuted by the fact of the survival, or perhaps we should rather say the successive revivals, of his principles. His position in the history of Education would seem to be this:—On the manner of teaching particular subjects his influence was partial and comparatively unimportant; but he compelled the educational world to revise the whole of their task, to take into their perview the ultimate destiny of man, and the means of leading him from his youth upwards straight towards that destiny. 'I find the battle raging,' says Pestalozzi, 'about particular and isolated systems of instruction; the mind is filled with fragments of truth, while the very spirit of truth itself is quenched; we have forms, not so much of thinking, as of verbal expressions about what has been thought—forms which suck the blood out of good sense, like a marten that fixes itself on the neck of a poor dove. *I* put to myself the question, "What would you do if you wanted to give a single child all the theoretical knowledge and practical skill which he requires in order to attend properly to the great concerns of life, and so attain to inward contentment?"' This passage, taken alone, might almost lead us to suppose that Pestalozzi took such a view of the objects of education as might have commended itself to the mind of an Epicurus or an Antonine; and I have quoted it, partly with a view of correcting that impression, and partly because it forms a fitting introduction to the main topic of this chapter.

His religious teaching.

It is commonly said, by those who have undertaken to expound the 'Principles of Pestalozzi,' that '*the first of those principles is that education must be religious.*' Now it is quite true that, in common with most men of reflection and intelligence, Pestalozzi held that education without religion loses half its depth and value, and more than half its moulding influence and penetrative power; but to say that religion was 'the leading principle,' or even a 'prominent feature' in his system, involves a grave misconception. Nor would it be quite true (though perhaps it might be nearer to the truth) to say, as some have said, that Pestalozzi was an enthusiast whose enthusiasm took the form of subordinating everything to intellectual and moral culture;—that religion was looked upon by him as 'subsidiary to that end,' and that his endeavour was to 'apply Christianity to the business of education.' The fact is that with him religion was an antecedent condition, a presupposed element, apart from which education would be useless or impossible. It was not so much that religion was to be taught, as that everything was to be taught religiously. Thus, for example, the lessons in natural science and history were to be of such a character, that the child himself could not fail to *infer* the necessity of a Final Cause and an overruling Providence. The works of God were to be successively presented in such vivid and attractive colours to the mind of the learner, that childish wonder should gradually brighten into admiration, and admiration warm into love. And 'there were to be not only religious lessons, but religious influence, and religious example; religion in spirit, in aims, in methods, in associations, in principles, in practice.'

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* See page 3.

† Speaking of the intended opening of a new educational institution, 'I,' says he, 'was to represent the abbot of the monastery; really, in certain respects, I was more fitted to be the donkey, or, at least, the sheep of the monastery than the abbot. My friends, I speak plainly.'

All this is as it should be, but here again Pestalozzi's actual practice fell lamentably short of his ideal. At Yverdun, if we are to believe the testimony of more than one of his own pupils, religion was far too much 'presupposed,' and too little inculcated. Moreover the religion which is said to have 'pervaded the institution' was a religion of the feelings,—ignoring the corruption of human nature, ignoring doctrine, almost ignoring Scripture, and deriving no strength or authority either from church tradition or from sacramental communication of grace. In fact, Pestalozzi's own religious views were for a long period of his life dim and unsettled in the extreme, and though they cleared and brightened with his advancing age, they were never wholly free from the transcendentalism and haziness which are supposed, rightly or wrongly, to be characteristic of Teutonic Protestantism.

(To be continued.)

Our Certificate Class.

BY DR. GEORGE BEACH, M.A.

Head Master of Christ Church School, Macclesfield.

DOMESTIC ECONOMY.

The name of this subject might with some propriety discard its adjective and stand alone as 'Economy,' for this word itself means the regulation of a household.

Schoolmistresses have been frequently reproached with knowing nothing of the art, and but a mere 'smattering' of the science of Domestic Economy.

We believe this censure to be without sufficient foundation, for 'only a per centage of the marks will be given for this paper in the case of those students who do not present a certificate, signed by the college superintendent, to the effect that she is satisfied with their practical efficiency in some specified portion of the work usually comprehended under the name of Industrial Training.'

In fact, it has been asserted, that in some colleges this necessity for practical knowledge is utilised as a pretext for imposing a certain amount of drudgery upon the students, especially in the way of laundry work.

Against the Syllabus itself, and the questions based thereon, no fair complaint can be lodged, the knowledge required being essential, and the tests imposed very fair ones.

It should be noted that the term 'Household Management,' added to the last Syllabus, immensely increased the area of study. Until 1886, 'the laws of health as applied to school premises, scholars, and teachers' were demanded: but with greater propriety these are now required under the head of School Management.

In short, as the teacher legally and actually stands towards the scholar '*in loco parentis*,' who can draw a line of demarcation between the school and the home, School Management and Domestic Economy?

As a rule twelve questions are propounded, of which eight may be answered. No portion of the Syllabus is left untested, and several questions are generally addressed to common sense and practical experience. *The first year's course is also revised.*

It is, moreover, most affecting to note with what touching solicitude a paternal department watches over the lone schoolmistress (always assumed to be dedicated to livelong spinsterhood), brooding over her mental and bodily habits, her meals, her disposal of superabundant cash, her longevity, and even insisting on the need of relaxation and holidays. Considerable attention is also directed to the teaching of cooking in elementary schools.

Food, Beverages, Cooking, &c.—Questions have been asked respecting the constituents of common articles of food, the value of a fish diet, non-nitrogenous diets, what diets will produce warmth, fat, vigour, muscle and bone; the different methods of cooking meat, the evils of bad cooking, defects of ordinary domestic cooking, scientific objects of cooking, French versus English cooking, penny dinners for school children, several economical family dinners, how to cook herring, mackerel, cod, plaice, potatoes and beans, how to make bread, beef-tea, mutton-broth, pea-soup, Irish stew, plum pudding and apple pie, different methods of stewing (whether to cook meat or make soup); the impurities of water and their remedies, cookery classes, provision of fuel and apparatus for them, cookery teacher's salary, scheme of lessons for class, materials for demonstration lessons, disposal of cooked dishes, the resulting benefit; scheme of lessons on cottage cookery, on sick cookery, schemes of lessons for the stages of Domestic Economy as a 'specific'; the merits of closed versus open fire places, the utensils required for class and home cookery, the action of the liver and lungs upon food and air, the qualifications of a good sick nurse, and rules for managing a sick-room.

Clothing, &c.—This really belongs more particularly to the First Year Syllabus, but in the Second Year, information has been requested about the animal and other substances used in dress, the means of preparing these, the washing of different fabrics, the different methods of ironing, the colour of clothes, fashions in dress, the arrangements of a laundry, and the qualities and use of borax, soda, ox-gall, chloride of lime, soap, starch, alum, salt, blue, hard and soft water, the temperature of the body, and the necessity of personal cleanliness.

Home, &c.—The candidate has been examined upon ventilation, its best methods, its ordinary defects; upon drainage, with special reference to disconnection, sewer-ventilation and trapping; upon the site, aspect, drainage, elevation and water-supply of dwellings; and has been requested to draw the plans of the ground and upper floors of a working-man's cottage.

Household and School Management.—Queries are propounded concerning the disposal of an artisan's or peasant's daily or weekly wage (the number in family being given); concerning lime-washing versus papering; concerning the history of, and the arguments for and against, vaccination; concerning the causes and symptoms of, and the precautions to be taken against, scarlet and other fevers, cholera, small-pox, diphtheria, measles, whooping-cough, mumps, ringworm, and other infectious or contagious diseases; concerning the ordinary disinfectants, and the steps to be taken in case of croup, nose-bleeding, dog-bite, poisoning, scalds, burns, cuts, wounds, fainting and broken bones.

Investments and Saving.—Inquiries are made relating to high interest and bad security, Government and school savings' banks, Post Office annuities, life insurance, and friendly and co-operative societies. The increased facilities for saving afforded by Government within the last month should be ascertained.

Upwards of two hundred and forty questions have been threshed out to compile the above analysis; and our lady readers may perchance have their confidence in it increased, when we inform them that we write not only from studied theory, but also from an almost unique masculine and practical experience of the various enumerated details.

POLITICAL ECONOMY

may be defined as the science which treats of the nature and operation of the general causes influencing and regulating the production, accumulation, distribution and consumption of things having an exchangeable value, in reference to the effects of such production, accumulation, distribution and consumption upon the national wealth and welfare.

This definition is much more comprehensive than the ordinary ones, and, by including such points as the *distribution* as well as the accumulation of wealth, and the *welfare* in addition to the wealth of the nation, somewhat redeems the science from the charges of cool-bloodedness with which in its infancy it was perhaps justly assailed. According to this definition, a political system which allows immense fortunes to exist side by side with, and perhaps at the expense of, wide-spread destitution—which permits of a monopoly of land whilst multitudes of able-bodied labourers are emigrating, is radically vicious (Pliny says 'Latifundia perdidere Italiam.') Mill says 'Political Economy is more akin to the physical sciences than any other branch of politics. Some people decry it as unfeeling, but it is no more unfeeling than Gravitation, which breaks the neck without scruple of the most amiable person who seriously infringes its laws.' It is not empirical; its laws are as natural as those of Mechanics and Astronomy. Legislation cannot for it create new principles, it can only limit the action of, or allow free scope to, those already naturally operative. Nevertheless, the science is distinctly national in its aspirations; it does not contemplate the welfare of other countries except as subsidiary and conducive to our own. It aims at securing for the fatherland the peculiar advantages distributed throughout the world; but as these are very evenly apportioned, fortunately the patriot and cosmopolitan are not necessarily antagonistic.

In view of the numerous complex social questions, imperatively demanding solution, the Department has acted with unwonted wisdom in including this subject within the certificate curriculum; but we are afraid that as far as elementary schools are concerned (see first question for 1882) the scholars' immaturity of intellect will only allow its principles to be dogmatically inculcated.

The student should read Cassell's 'Laws of every day life,' and 'Citizen Reader,' which although professedly written for the scholars of elementary schools are eminently worthy of more than the casual perusal of everybody.

Our candidates may take it in some instances instead of a second language. Where this is allowed, we should advise them to do so.

Apparently, we are left much in the dark as to the detailed knowledge required, for the Syllabus only states that 'Elementary questions in Political Economy' will be given. It is, however, significant that from 1871 (when Mrs. Fawcett's able little manual appeared) until 1885, the Syllabus said 'Works on this subject published *of late years* for the use of schools, contain matter to which these questions will have reference.'

Our analyses of Mrs. Fawcett's book, and the certificate questions, corroborate the inference, that under the general title 'Works' Mrs. Fawcett's 'Work' was indicated. With a little supplementalising it even now continues the best for our purpose.

Until 1873 any paper which fell below fair was cancelled, but we know that now this regulation has been rescinded, and in any case we trust it could not have affected our students.

In the examination, probably the generous choice of eight out of fourteen questions will be conceded, but the last question (always a Notes of Lesson on one of three given subjects) is practically compulsory, students being '*advised*' to answer it. This is not the only instance where the departmental 'may' is equivalent to 'must.'

One question at least is always a general one, and frequently illustrations from History of ill-effects resulting from the violation of economic laws (such as the attempts to fix the price of labour or commodities, and to obtain both good security and extortionate interest) are requested.

Bearing in mind our former deductions, and despite the taciturn Syllabus, we can readily, from a tabulation and comparison of two hundred and thirty questions, unveil its mysteries,

The area of enquiry being strictly elementary, the questions naturally tend to repeat themselves. For instance, in the 1883 paper, no question appeared which has not been set before or since that date.

It seems likely from current controversies and events, that some of the following questions (all of which have previously done duty) will be re-asked :—'Why am I bound to obey the law?' 'Describe Bi-metallism.' 'Enumerate the recent reforms of taxation.' 'Compare the centralisation with the localisation of Government.' 'Discuss Peasant Proprietorship.' 'What do you know of the theory of Rent?' 'Describe the different systems of Land-tenure.' 'What is Tenant-right?' 'Explain the causes of the existing agricultural depression.' 'Give the arguments in favour of Free Trade.' 'What do you know of Fair Trade and Retaliatory Duties?' 'What is the area of Political Economy, and how do its laws differ from statutory enactments?'

Most of the following points have also been touched upon several times :—

Wealth.—Its production from labour, its natural sources, how it differs from capital, the fallacies of the mercantile system.

Capital.—Necessity for its unequal distribution, fixed and circulating capital, productive and unproductive consumption of capital, luxury versus prodigality, luxury versus necessities, relation of capital to labour.

Labour.—Conditions of efficient labour, division of labour, division of labour versus invention, co-operation of labour, greater produce for less labour really means higher wages, advantages and disadvantages of localising any industry, description of any manufacturing industry, effects upon labour of sanitation and technical education, machinery versus labour, trades unions, strikes, boards of arbitration, co-operative stores, industrial partnerships, Communism, Factory Acts, demand for commodities not necessarily a demand for labour.

Wages.—How nature of occupation affects wages, population versus wages, profit versus wages, poor relief versus wages, Mill's wages fund theory, employers versus employés.

Trade and Commerce.—Supply and demand, monopolies versus competition, benefits of commerce, diversity of productions is the sanction of exchange, free trade is the territorial division of labour, civilising effects of trade, consumer versus producer, law of diminishing returns, balance of trade, exports and imports, value versus price, natural versus market price, fixed legal prices, price of residuals or subsidiaries, profit versus interest, elements of profit, credit, universal system of weights and measures, joint stock companies, effect of war upon economic conditions.

Currency, &c.—The three essential qualities of a true currency, explanation of our use of three metals with a monometallic standard, intrinsic value of currency, appreciation and depreciation of gold, debasement of currency, paper currency, convertible and inconvertible currency, bills of exchange, banking transactions, runs on a bank, savings' banks, savings versus insurance.

Taxes, &c.—The principles of a good tax, direct and indirect tax, income tax—its history, merits and defects, poll taxes, the National Debt, Customs, Poor Rate, Post Office, when should war expenditure be met by loans, and when by taxes.

Land, &c.—Ricardo's theory of rent, margin of cultivation, object of Jewish land laws.

N.B.—Nothing of any importance given during the last eighteen years is omitted from the above analysis.

CORRECTIONS OF LAST MONTH'S ARTICLE.

Page 333, line 37, insert 'two on Book IV.' after the words 'four on Book III.'

Page 333, line 41, read 14 instead of 15.

Page 334, fourth line of 'C,' read $(3x + 4y)$ instead of $(3x + 4)y$.

ANSWERS TO CORRESPONDENTS.

We shall be pleased to reply briefly, and through this column, to any seeking information or advice.

Answers demanding urgency will be promptly forwarded per post on receipt of stamped and addressed envelope.

ADMIRER.—You may expect no formal Parsing or Analysis in the Second Year Grammar Paper for Males, although occasionally you are called upon to 'explain grammatical peculiarities.' Parsing and Analysis were last given at Christmas, 1877.

JOHN S. (Tranmere).—We cannot tell.

J. F. (West Boldon), TIMIDUS (Hartlepool) answered per ordinary post.

ANNO SECUNDO.—(1) In English 'Nominative Absolute'; (2) In Latin 'Ablative Absolute'; (3) In Greek 'Genitive Absolute.'

PUZZLED.—You will find the required information in our first (March) paper.

MASTERMAN READY.—We shall give a series of questions next month.

H. P. S. (Wolverhampton) and T. P. (Stockport).—McLeod's Constitutional History is published by W. Stewart and Co., Holborn Viaduct Steps, price 3s. 6d.

ORGANIST.—Music will be treated of next month.

ROUTINE (GREATLY ALTERED) FOR OCTOBER. (MALES.)

DAY	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
MONDAY	The vital points of the Code. Articles 3, 11, 12, 13, 15, 82, 83, 89, 90, 92, 94, 104, 106, 107, 108, 109, 110, 111. The different circulars. See Heller's Code	Study the Notes in your Euclid, whether Todhunter or Potts, &c.	Paraphrase Lines 71—92 of Cæsar Act III. Scene 2	Euclid — Deductions of Books III. and IV.	Paraphrase Lines 706—727 of Comus	Revise Geography of England	Summarise Comus' sophistry in favour of voluptuousluxury, and 'the Lady's' reply	Map of Burmah	History — Twenty-seventh chapter of McCarthy	Why should a Teacher of the Young study 'Mental & Moral Philosophy'?	Euclid — Any	Outlines of History to 1837
TUESDAY	Geography of New Zealand	Arithmetic or Algebra	Outlines of History, to end of George II.	Revise Music	History — Twenty-sixth chapter of McCarthy	Draw up a course of ten lessons for First Stage of Mechanics	Revise Grammar from Text-Book	Algebra	Place Bill (1742) Riot Act (1715) Libel Acts (1792, 1843) Reform Bill (1832)	Euclid — Any	The influence of Spenser and Shakespere upon Milton's poetry	Disinfectants
WEDNESDAY	Algebra	Study the points of 'Reasoning' mentioned in our Analysis given in the April No.	Music — The compass and register of voices, voice training	Algebra or Elementary Mensuration	Euclid — Revise any defective portions	Describe the characters of Portia and Lepidus	Euclid — Deductions of Books III. and IV.	Paraphrase from Essay on Milton 'The most fatal error which a poet can possibly commit in the management of his machinery . . . We can reason about it only by symbols'	The 'climates' of our important Possessions. How is our trade affected thereby?	Geography of European Possessions	Arithmetic	History — Revise McCarthy
THURSDAY	Write 30 lines of Composition upon 'Force is no Remedy'	Write a Large-hand copy of 'Fragmentary,' and a Small-hand copy of 'The paths of glory lead but to the grave'	Euclid — Notes in Text-Book	Geography of West African and South American Possessions	Arithmetic	Lives of Wolsey, Burleigh, Raleigh, Hampden, Algernon Sydney, and Marlborough	Proofs of Algebraic Rules	History — Revise McCarthy	Proofs of Algebraic Operations	Revise Preface of Cæsar	Draw rough 'Sketch-maps'	The common errors perpetrated in ordinary Notes of Lessons
FRIDAY	Revise Notes of Cæsar	Revise Geography of I. a, b, c (see syllabus)	Outlines of History to 1793	Relations of the Progressions to each other	Canon Warburton's Article in our September issue on Pestalozzi	Euclid — Any Deductions	Fish and Marine Animals of the various Zones	Euclid — Notes in Text-book	Contrast, from Macaulay's description, The Royalists and the Puritans	Euclid — Any	Macaulay's defence of Milton as regards 'The Great Rebellion,' 'The Execution of Charles,' 'His office under Cromwell'	Maps of Ceylon and Van Diemen's Land

DAY	FIRST WEEK				SECOND WEEK				THIRD WEEK				FOURTH WEEK			
SATURDAY	Important Dates to end of George III.	Re-read Text of Cæsar	Theory of Equations (Quadratic)	Music — 1 Major and Minor Scales 2 Intervals 3 Transposition. — 1 Modes 2 Intervals 3 Bridge-notes and Removes	Revise Notes of Comus; or History (Making of Laws)	'Form VIII. M.' Examination Duplicate and Exception Schedules	Euclid — The different methods of Reasoning employed by Euclid	Music — Time	Geography of Asiatic Possessions excluding India and Burmah	Algebra	Outlines of History to end of George III.	Algebra	Algebra	Important Dates to end of William IV.	Any subject requiring revision	Write out (for future use) a Summary of Canon Warburton's last Article on Pestalozzi

ROUTINE (GREATLY ALTERED) FOR OCTOBER. (FEMALES.)

<table>
<tr><th>DAY</th><th colspan="12">FIRST WEEK</th><th colspan="12">SECOND WEEK</th><th colspan="12">THIRD WEEK</th><th colspan="12">FOURTH WEEK</th></tr>
<tr><td>MONDAY</td><td colspan="4">The vital points of the Code. Articles 3, 11, 12, 13, 15, 82, 83, 89, 90, 92, 94, 104, 106, 107, 108, 109, 110, 111. The various Circulars. (See Heller's Code)</td><td colspan="4">Analyse and Parse difficult words of lines 89–100 of Cæsar, Act I. Scene 3</td><td colspan="4">Revise Geography of the British Isles</td><td colspan="4">Bonaparte's Egyptian and Syrian expedition. Battle of Nile (1798)</td><td colspan="4">Compound and Simple Interest</td><td colspan="4">The various forms of government in our colonies or dependencies</td><td colspan="4">Music — Time</td><td colspan="4">Study the points of 'Reasoning' mentioned in our Analysis given in the April Number</td><td colspan="4">Sketch Maps of British Guiana and the Fiji Isles</td><td colspan="4">Stocks</td><td colspan="4">What do we export to our principal Possessions ?</td><td colspan="4">Write an essay of thirty lines upon 'Public Monuments'</td></tr>
<tr><td>TUESDAY</td><td colspan="4">The Administration of Justice. The making of Laws.</td><td colspan="4">Arithmetic — Miscellaneous Problems</td><td colspan="4">Paraphrase lines 93-108 of Cæsar, Act III. Scene 2</td><td colspan="4">Map of English Channel noting specially 'The Channel Islands'</td><td colspan="4">Revise from Text-Book 'Household Expenses'</td><td colspan="4">Particularise the quantity of material (with cost) required for the three specified garments</td><td colspan="4">Music —
(1) Major and Minor Scales
(2) Intervals
(3) Transposition
(1) Modes
(2) Intervals
(3) Bridge notes and Removes</td><td colspan="4">Discount</td><td colspan="4">The Naval and Military Forces of our Empire</td><td colspan="4">History — Dates</td><td colspan="4">Revise 'Food in Common Use' from Text-Book</td><td colspan="4">Any Needlework</td></tr>
<tr><td>WEDNESDAY</td><td colspan="4">Music — The compass and register of voices. Voice training</td><td colspan="4">Draw up a course of ten lessons for 1st Stage of Domestic Economy</td><td colspan="4">Practise Needlework Diagrams</td><td colspan="4">Contrast Pitt's policy before 1793 with his policy after that date</td><td colspan="4">Proofs of Arithmetical Rules</td><td colspan="4">Revise Grammar from Text-Book</td><td colspan="4">Revise any defective Geography</td><td colspan="4">Describe the best manner of
(1) preparing
(2) boiling, and
(3) serving-up a dish of potatoes</td><td colspan="4">Canon Warburton's Article, in our September issue, on Pestalozzi</td><td colspan="4">Addison and the 'Spectator'</td><td colspan="4">Music —
(1) Major and Minor Scales
(2) Intervals
(3) Transposition
(1) Modes
(2) Intervals
(3) Bridge notes and Removes</td><td colspan="4">'Form VIII. M.' Examination and Exception Schedules</td></tr>
<tr><td>THURSDAY</td><td colspan="4">Draw rough 'Sketch Maps'</td><td colspan="4">Pay special attention to button-holing</td><td colspan="4">Stocks</td><td colspan="4">Disinfectants</td><td colspan="4">Revise 'Food in Common Use' from Text-Book</td><td colspan="4">Lives and works of Burke, Paley, Smollett, Sterne, and Savage</td><td colspan="4">Analyse and Parse difficult words of lines 26-40 of Cæsar, Act II. Scene 2</td><td colspan="4">Value of Colonies for
(1) Emigration
(2) Commerce
(3) Civilisation
(4) Strategic points</td><td colspan="4">Arithmetic — Miscellaneous Problems</td><td colspan="4">The vulnerable points of our Empire</td><td colspan="4">Explain, using diagrams, the nature and importance in a system of drainage of
(1) Trapping
(2) Disconnection
(3) Ventilation</td><td colspan="4">Arithmetic — Miscellaneous Problems</td></tr>
<tr><td>FRIDAY</td><td colspan="4">Describe fully the process of making bread</td><td colspan="4">Revise any Arithmetic</td><td colspan="4">The Assiento (1713), Granville Sharp, Wilberforce, Clarkson</td><td colspan="4">Paraphrase lines 140-161 of Cæsar, Act I. Scene 2</td><td colspan="4">Any subject requiring revision</td><td colspan="4">The common errors perpetrated in ordinary Notes of Lessons</td><td colspan="4">Revise 'Investments' from Text Book</td><td colspan="4">Give an account of the 'Coolness' between Pope and Addison</td><td colspan="4">Practise Running Tucks and 'Back' Stitching</td><td colspan="4">Why should a Teacher of the Young study 'Mental and Moral Philosophy'?</td><td colspan="4">Re-read the second half of Addison</td><td colspan="4">History. — Outline from Text Book</td></tr>
<tr><td>SATURDAY</td><td colspan="3">Essay on Addison — Wills'. The Grecian, Jonathan's, Garraway's, St. James's, and 'Coffee Houses' of the period</td><td colspan="3">Draw up a short account of the French Revolution noting its effects upon English politics</td><td colspan="3">The principal trade routes between the different portions of our Empire</td><td colspan="3">Write a Large-hand copy of 'Fragmentary,' and a Small-hand copy of 'The paths of glory lead but to the grave'</td><td colspan="3">Compound Proportion</td><td colspan="3">All the Preface to Cæsar</td><td colspan="3">Describe the interior of a Laundry Room, and the vessels and implements required for washing clothes</td><td colspan="3">Practise any Plain Needlework</td><td colspan="3">Vulgar and Decimal Fractions</td><td colspan="3">Revise Preface to Cæsar</td><td colspan="3">Draw the required Needlework Diagrams in your 'Drawing-to-Scale Book'</td><td colspan="3">Revise our French Wars during eighteenth century</td><td colspan="3">History — Dates</td><td colspan="3">Classify our Possessions as obtained by
(1) Settlement
(2) Purchase
(3) Treaty
(4) Conquest</td><td colspan="3">Insurance</td><td colspan="3">Write out (for future use) a Summary of Canon Warburton's last article on Pestalozzi</td></tr>
</table>

Knitting Maps.

BY MRS. J. D. HARRIS.

LADY'S CANADIAN MUFFLER.

5 Pins. No. 14 Chamber's bell gauge.

2½ oz. of Auchenia wool.

Cast on 24—24—20.

Knit 1, Purl 1, for ½ an inch.

A. Make a row of holes by putting the wool forward and knitting 2 together.

To increase for the Elbow.

B. Knit 12. Pick up a loop and purl it. This is to be the seam stitch down the back of the arm.

In every 4th succeeding round, increase 1 each side the seam stitch till you have 75 stitches in all.

To decrease for the Arm.

C. Knit 2 together each side the seam with 6 rounds between till you have only 63 stitches left.

Knit plain till the arm is 12 inches long.

D. Make a row of holes.
Knit 6 more rounds.

To form the Thumb Gusset.

E. It will now be better to add another pin, as the thumb must of course be exactly opposite the elbow.

Put 15 stitches each side the seam stitch on 1 pin, 12 on the next, 7 on the thumb pin, 12 on the other.

Knit 3 on the thumb pin, make a stitch, knit 1, make a stitch, knit 3.

Knit 2 plain rounds.

N.B.—The increasings for the gusset are always after the first 3 stitches, and before the last 3 on the thumb pin with 2 rounds between each increasing.

Increase till you have 18 stitches in the gusset.

You can now discard the extra pin. Add the 1st 3 stitches and the last 3 to the side pins, making 15 on each. Thread the 18 gusset stitches on a piece of wool, and knit for the hand about 3 inches.

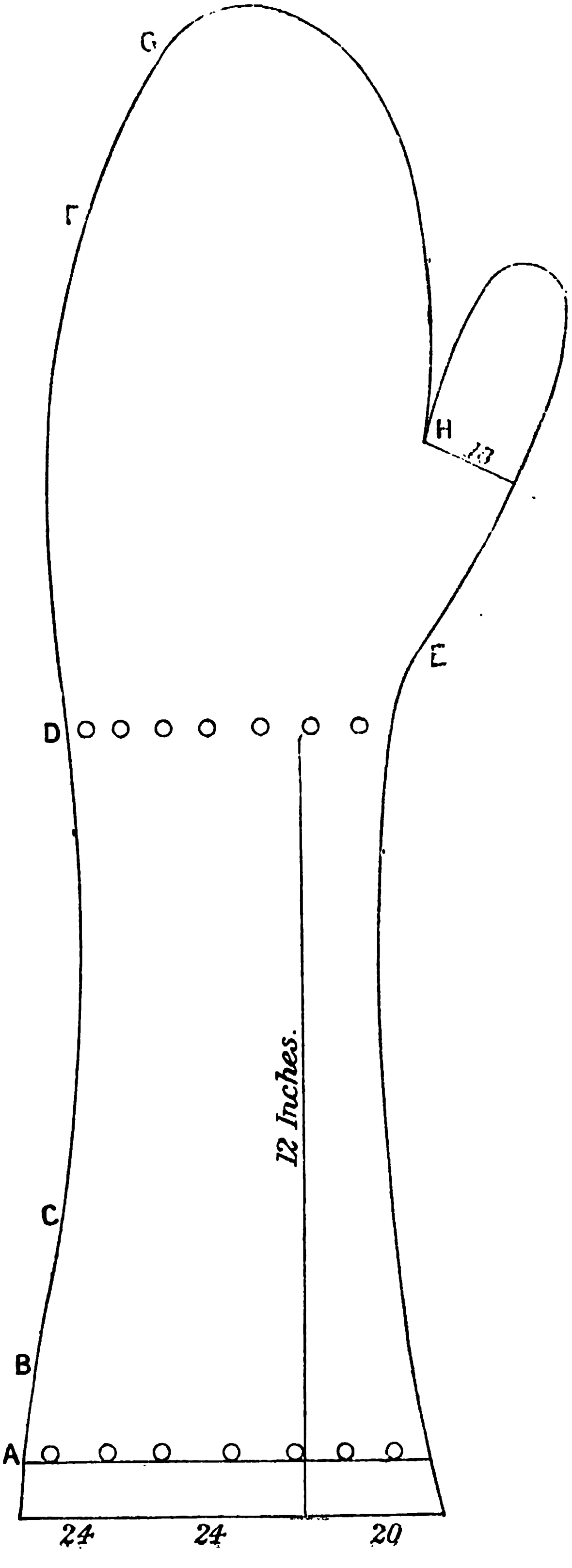
F. Reduce each side the seam stitch 3 times, with 2 rounds between.

G. Knit 2. Knit 2 together all round with one plain round between till you have only 31 stitches left. Put 15 each side the seam stitch, knit together and cast off.

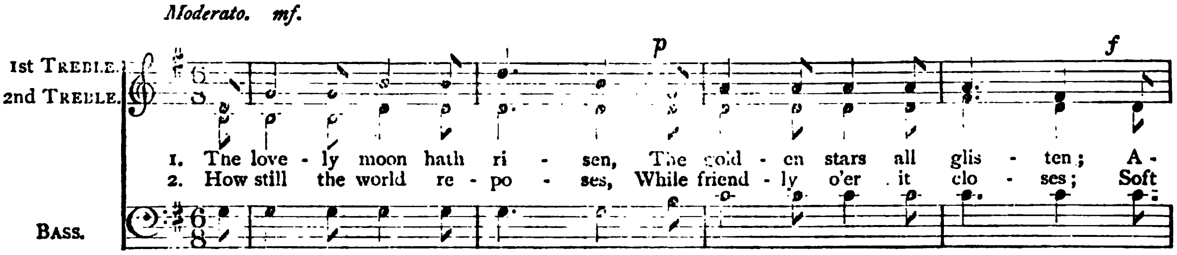
The Thumb.

H. Put 7 stitches on the 1st pin, 7 on the 2nd, 4 on the 3rd, add 4 more at the opening. Knit the thumb the length required. Then knit 2, knit 2 together till you have only 9 left, break off the wool, thread the 9 stitches, draw them up and fasten off.

The back of the hand should be embroidered gaily. A ribbon run in at the wrist, and an elastic and bow of ribbon at the elbow. As this muffler is to be worn over the gloves, plenty of room should be be allowed

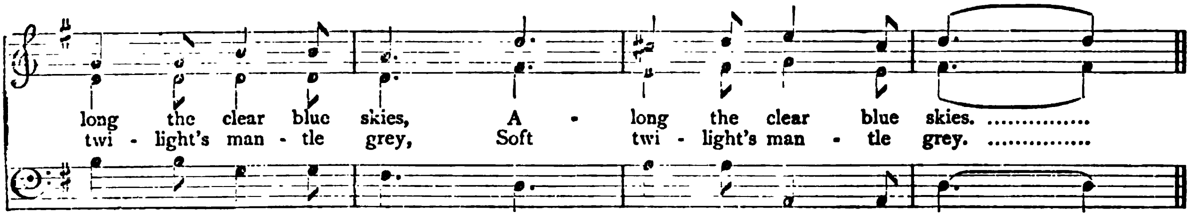


NIGHT.


Moderato. mf.
p
f
1st Treble.
2nd Treble.
1. The love - ly moon hath ri - sen, The gold - en stars all glis - ten; A -
2. How still the world re - po - ses, While friend - ly o'er it clo - ses; Soft
Bass.

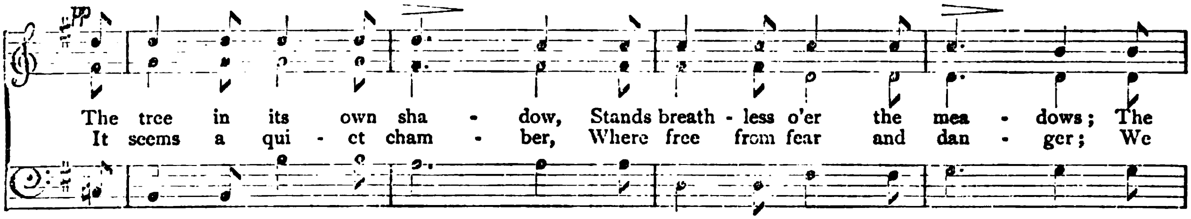
KEY G. *Moderato.* *mf.* *p* *f*

1st TREBLE. :s₁ | d :— :d | m :— :m | s :— :— | m :— :d | r :— :r | r :— :r | r :— :— | t₁ :— :s₁
2nd TREBLE. :m₁ | m₁ :— :m₁ | s₁ :— :s₁ | s₁ :— :— | s₁ :— :s₁ | s₁ :— :s₁ | s₁ :— :s₁ | t₁ :— :— | s₁ :— :s₁
BASS. :d | d :— :d | d :— :d | d :— :— | d :— :m | f :— :f | f :— :f | f :— :— | f :— :f


long the clear blue skies, A - long the clear blue skies. ....
twi - light's man - tle grey, Soft twi - light's man - tle grey. ....

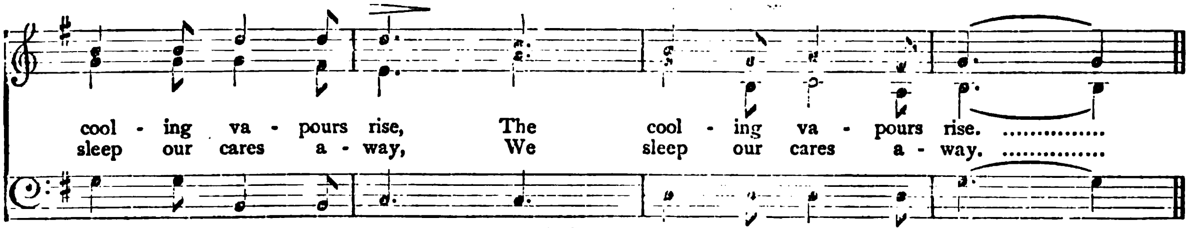
D.t.

d :— :d	m :— :m	ʳs :— :—	d' :— :—	t :— :d'	r' :— :t	d' :— :—	d' :—	
s₁ :— :s₁	s₁ :— :s₁	ˢd :— :—	m :— :—	r :— :m	f :— :r	m :— :—	m :—	
m :— :m	d :— :d	ᵗm :— :—	d :— :—	s :— :s	s₁ :— :s₁	d :— :—	d :—	


pp
The tree in its own sha - dow, Stands breath - less o'er the mea - dows; The
It seems a qui - et cham - ber, Where free from fear and dan - ger; We

f.G. *pp*

:ᵈ's | s :— :s | s :— :s | s :— :— | f :— :f | f :— :f | f :— :f | f :— :— | m :— :m
:ᵐt₁ | d :— :d | d :— :d | t₁ :— :— | t₁ :— :t₁ | t₁ :— :t₁ | s₁ :— :s₁ | s₁ :— :— | s₁ :— :s₁
:ᵗᵃf₁ | m₁ :— :m₁ | m :— :m | r :— :— | r :— :r | s₁ :— :s₁ | t₁ :— :t₁ | d :— :— | d :— :d


cool - ing va - pours rise, The cool - ing va - pours rise. ....
sleep our cares a - way, We sleep our cares a - way. ....

m :— :m	s :— :s	s :— :—	f :— :—	m :— :d	r :— :t₁	d :— :—	d :—	
d :— :d	d :— :t₁	l₁ :— :—	r :— :—	d :— :m₁	f₁ :— :r₁	m₁ :— :—	m₁ :—	
d :— :d	m₁ :— :m₁	f₁ :— :—	f₁ :— :—	s₁ :— :s₁	s₁ :— :s₁	d :— :—	d :—	

Quarterly Arithmetical Tests.

Standard I.—First Quarter.

1. $\begin{array}{r}5\\370\\6\\82\\409\\\hline\end{array}$

2. $\begin{array}{r}592\\50\\\hline\end{array}$

3. $\begin{array}{r}783\\412\\\hline\end{array}$

4. 10 × 2;
3 × 8;
5 × 4.

Second Quarter.

1. $\begin{array}{r}27\\4\\613\\890\\35\\\hline\end{array}$

2. $\begin{array}{r}836\\54\\\hline\end{array}$

3. $\begin{array}{r}672\\638\\\hline\end{array}$

4. 3 × 3;
4 × 11;
7 × 5.

Third Quarter.

1. $\begin{array}{r}506\\78\\951\\7\\284\\\hline\end{array}$

2. $\begin{array}{r}207\\109\\\hline\end{array}$

3. $\begin{array}{r}345\\56\\\hline\end{array}$

4. 4 × 9;
8 × 5;
6 × 12.

Standard II.—First Quarter.

1. 4,019 + 706 + 5 + 30,680 + 92 + 15,015.

2. Take 59,987 from 60,016.

3. 73,618 × 67.

4. 37d.; 56d.; 71d.

Second Quarter.

1. 30,468 ÷ 6. Write the answer in words.

2. 95,704 × 308.

3. An orchard has 46 rows of trees, 7 in a row, and 37 rows of trees, 9 in a row. How many trees are there in the orchard?

4. 93d.; 102d.; 117d.

Third Quarter.

1. 64,973 × 9,400.

2. 55,776 ÷ 7.

3. How many nails will it take to shoe 359 horses, if each shoe require eight nails?

4. 128d.; 135d.; 141d.

Standard III.—First Quarter.

1. Divide four hundred and nine thousand three hundred and ten by seventy-nine.

2. How many times is 407 contained in 398,860?

3. What number divided by 139 brings the quotient 139 and 79 remainder?

4. Find the quotient of 728,852 and 2,836.

Second Quarter.

1. Take 7¼d. from ten thousand pounds.

2. £7 19s. 8½d. + £50 6s. 10¼d. + 6½d. + £201,904 17s. 9¾d. + £8 13s. 11¼d. + £3,058,006 18s. + £7,020 15s. 3d.

3. A boy exchanged 406 marbles for some nuts, and for every seven marbles he got three nuts. How many nuts did he get?

4. A man bought a coat for 28s., a vest for 12s. 6d., a pair of trousers for 19s. 6d., and a dozen collars at 6½d. each; what change had he out of a five pound note?

Third Quarter.

1. Add sixty-nine pounds fifteen shillings and a farthing, twenty thousand and ten pounds nineteen shillings and eight pence halfpenny, ten pence farthing, seven hundred pounds and sixpence, two hundred and five thousand nine hundred and four pounds seventeen shillings and nine pence three farthings, three thousand and nine pounds fourteen shillings, and forty thousand four hundred pounds eleven shillings and eleven pence farthing.

2. Seven hundred and three thousand and seventy-three pounds sixteen shillings and five pence farthing minus seventy thousand three hundred and seven pounds sixteen shillings and seven pence three farthings.

3. A farmer bought 85 sheep for £165 15s.; how many shillings did each sheep cost?

4. From thirty guineas take thirteen half-guineas.

Standard IV.—First Quarter.

1. Multiply £915 10s. 8¼d. by 619.

2. From three hundred thousand pounds take nine thousand and ninety pounds fifteen shillings and a penny three farthings.

3. £7,086 9s. 5¾d. × 3,070.

4. Divide ten million ten thousand and ten pounds and ten pence by eight hundred and fifty.

Second Quarter.

1. Reduce 143,054 inches to miles, &c.

2. If I had 70 guineas, how many men could I pay their wages at 24s. 6d. each?

3. 17 parcels, each weighing 19 stone, were made out of 6 tons 14 cwt. How many lbs. were left?

4. What will a man's wage amount to in a year (not reckoning Sundays) at 4s. 10d. per day?

Third Quarter.

1. Find the price of a ton of coals when 288 tons cost £198.

2. If a foot of telegraph wire weigh 3 oz., what would half a mile weigh?

3. What is the cost of 739 gallons of milk at 2½d. per pint?

4. How many fields, each 3 a. 3 r. 33 po., can be made from an estate containing 130 a. 2 r. 9 po.

Standard V.—First Quarter.

1. Find the value of fifty thousand and ninety articles at 16s. 10¾d. each.

2. What is the cost of 19 tons 17 cwt. at £1 7s. 8¼d. per cwt.?

3. What is the amount for 26 days 10 hrs. 52 min. at 15s. a day?

4. Find the cost for 5 miles 6 fur. 8 po., charging 2d. a yard for wire, and £3 15s. a mile for the labour.

SECOND QUARTER.

1. How long will it take 35 horses to eat some food which 65 horses can eat in 28 days?

2. If 3 ac. 3 ro. 30 po. produce a crop worth £51 3s. 9d., how much was that per acre?

3. Make an account for:—
340 herrings at 1s. 4d. per score;
54 oysters at 2s. 6d. per dozen;
3 dozen rabbits at 13d. each;
$5\frac{1}{2}$ dozen mackerel at $5\frac{1}{2}$d. each.

4. What must be given for 17 acres 18 square poles of land at the rate of £109 10s. per acre?

THIRD QUARTER.

1. Which is the greater and by how much—$\frac{1}{5}+\frac{1}{7}$ or $\frac{1}{4}+\frac{1}{9}$?

2. Bill:—
$17\frac{1}{2}$ yards at 1s. 10d. per yard;
23 yards at $8\frac{1}{2}$d. per yard;
19 blankets at 19s. 6d. per pair;
13 pairs of blankets at 15s. 9d. per pair;
40 towels at 11s. per dozen.

3. A boy filled $\frac{1}{5}$ of a book on Monday, $\frac{1}{6}$ on Tuesday, and $\frac{2}{7}$ on Wednesday. How much was there left?

4. If a train travel 40 miles an hour, how many yards does it go in a second?

STANDARD VI.—FIRST QUARTER.

1. Add 15 eighths, 17 ninths, 13 sevenths, and 19 fifths.

2. What is the L. C. M. of the numbers from 2 to 12?

3. $(7\cdot5496 \times \cdot00385) \div 10{,}000$.

4. Divide $\dfrac{\frac{3}{7}-\frac{2}{5}}{\frac{3}{7}+\frac{2}{5}}$ by $\dfrac{5\frac{1}{3}}{5-\frac{1}{3}}$.

SECOND QUARTER.

1. Find the value of $794\frac{1}{2}$ articles at £1 15s. $8\frac{3}{4}$d. each.

2. Reduce $5\frac{5}{8}$d. to the decimal of 13s. 9d.

3. Find the sum of $7\frac{5}{9}$ and $9\frac{7}{11}$, and subtract it from $17\cdot\dot{5}\dot{7}$.

4. If a snail crawl $4\frac{1}{5}$ inches in $2\frac{1}{3}$ minutes, how long will it take to crawl three quarters of a yard?

THIRD QUARTER.

1. What is the interest on £3,597 16s. 8d. at 3 per cent. for half a year?

2. From $\frac{3}{5}$ of $\frac{4}{9}$ of 10 guineas take $\frac{7}{8}$ of $\frac{11}{12}$ of £2.

3. To what sum will £495 amount in $2\frac{3}{4}$ years at $4\frac{1}{4}$ per cent.?

4. Take the least from the greatest of $\cdot79\dot{8}$, $\cdot7\dot{9}\dot{8}$, and $\cdot\dot{7}9\dot{8}$.

STANDARD VII.—FIRST QUARTER.

1. A, B, and C can do a piece of work in 8 days. B can do it in 24 days, and C in 20 days. In what time can A do it?

2. I travelled $247\frac{1}{2}$ miles in $8\frac{1}{4}$ days of $8\frac{1}{3}$ hours each. What distance can I go at the same rate in 10 days of 9 hours each?

3. At what rate per cent. will £351 5s. amount to £435 11s. in 6 years?

4. If 18 men work 8 days of 9 hours each for £22 10s., how many hours per day must 24 men work to obtain £30 in 6 days.

SECOND QUARTER.

1. What principal will gain £60 2s. 3d. in $3\frac{1}{2}$ years at 3 per cent.?

2. Find the average of all the numbers ending in seven from 1 to 100.

3. Divide the sum of $5\cdot\dot{3}\dot{8}$ and $5\cdot3\dot{8}$ by their difference.

4. Ten suits of clothes contain an average of $4\frac{1}{2}$ yards; 4 of them have $4\frac{5}{8}$ yards each, and 5 of them $4\frac{1}{4}$ yards each; what does the remaining suit contain?

THIRD QUARTER.

1. If 1s. 9d. be gained on 9 yards of flannel at $10\frac{1}{2}$d. per yard, what is the gain per cent.?

2. What number increased 40 per cent. amounts to $264\frac{3}{8}$?

3. Three fields are purchased for £490, £768, and £2,186; they contain 3 a. 3 r. 25 po., 5 a. 1 r. 30 po., and 8 a. 2 r. 15 po. What is the average cost of all per acre?

4. By selling a watch for £7 1s., 6 per cent. was lost; what should it have been sold for to gain 12 per cent.?

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	872.	1,569.	1,826.
2.	542.	782.	98.
3.	371.	34.	289.
4.	20; 24; 20.	9; 44; 35.	36; 40; 72.

STANDARD II.

	FIRST.	SECOND.
1.	50,517.	5,078.
2.	29.	29,476,832.
3.	4,932,406.	655 trees.
4.	3s. 1d.; 4s. 8d.; 5s. 11d.	7s. 9d.; 8s. 6d.; 9s. 9d.

THIRD.

1.	610,746,200.	3.	11,488 nails.
2.	7,968.	4.	10s. 8d.; 11s. 3d.; 11s. 9d.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	5,181 + 11.	£9,999 19s. $4\frac{3}{4}$d.	£270,095 19s. 10d.
2.	980 times.	£3,266,999 12s. $1\frac{1}{4}$d.	£632,765 19s. $9\frac{1}{2}$d.
3.	19,400.	174 nuts.	39 shillings.
4.	257.	£1 13s. 6d.	£24 13s. 6d.

STANDARD IV.

	FIRST.	SECOND.
1.	£566,715 15s. 6¾d.	2 mls. 2 fur. 2 po. 2 yds. 2 ft. 2 in.
2.	£290,909 4s. 10¾d.	60 men.
3.	£21,755,475 1s. 0½d.	10,486 lbs.
4.	£11,776 9s. 7¾d. + 90 q.	£75 12s. 10d.

THIRD.

1. 13s. 9d.
2. 7,920 oz., or 4 cwt. 1 qr. 19 lbs.
3. £61 11s. 8d.
4. 33 fields.

STANDARD V.—FIRST.

1. £42,315 12s. 3½d.
2. £549 11s. 11¼d.
3. £19 16s. 9½d.
4. £106 7s. 1½d.

SECOND.

1. 52 days.
2. £13.
3. £1 2s. 8d. + 11s. 3d. + £1 19s. + £1 10s. 3d. = £5 3s. 2d.
4. £1,873 16s. 4½d.

THIRD.

1. $\frac{1}{4} + \frac{1}{9}$ by $\frac{33}{1200}$.
2. £1 12s. 1d. + 16s. 3½d. + £9 5s. 3d. + £10 4s. 9d. + £1 16s. 8d. = £23 15s. 0½d.
3. $\frac{73}{210}$.
4. $19\frac{5}{9}$ yards.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	$9\frac{1281}{4330}$.	£1,419 10s. 1⅜d.	£53 19s. 4⅓d.
2.	27,720.	·03⅕.	£1 3s. 11d.
3.	·000002906596.	·38.	£552 17s. 0¾d.
4.	$\frac{3}{232}$.	15 minutes.	·0001911 or $\frac{7}{36630}$.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	30 days.	£572 10s.	$28\frac{1}{7}$ per cent.
2.	324 miles.	52.	189.
3.	4 per cent.	2,133.	£192.
4.	12 hours.	5¼ yards.	£8 8s.

—o—

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,

Ex-President of the N.U.E.T.

VII.

THE specimen essay which we gave last month for the benefit of our students was of a practical kind, and its subject was one which must prove specially interesting to those engaged in the work of teaching. We refer to it now for the purpose of pressing home the hint that, where it is possible, subjects for essays should be treated in a practical manner.

Amongst our homely proverbs are many which afford excellent opportunity for such practical treatment in the form of explanatory amplification and instructive illustration. Some popular sayings, indeed, express moral truth in a subtle or poetical fashion, and thus invite an argumentative style in unravelling and illustrating their meaning. But others are eminently plain and practical, and can best be treated by stating and grouping facts which are learnt by observation and experience, and serve to explain and exemplify the teaching embodied in the sayings.

As a sample of this particular kind of subject and its treatment we propose to place before our readers this month an essay on the practical proverb—

FIRE IS A GOOD SERVANT BUT A BAD MASTER.

It is hardly possible to over-estimate the importance of a proper understanding and appreciation of the familiar saying, "Fire is a good servant but a bad master." It is easy to express its meaning in other words. It means that fire is of great use to us as long as it is under control, but it does great mischief when it passes beyond control.

Fire may be defined as the manifestation of chemical changes in substances subject to great heat. As long as heat and the chemical changes produced by it can be governed useful results may be secured, but when this heat and its consequences go on extending to fresh materials, and become independent of human direction, the result may be great danger and destruction of property and of life.

In considering the manifold uses of fire we can hardly help recalling the fact that man has been defined as the only animal that makes a fire. The natural method of kindling a fire as practised by savages is that of rubbing together two pieces of dry wood. It has been adopted by travellers and other civilised people when dependent on the simplest operations for the preparation of their food. Other natural means of producing great heat and kindling fire for the service of man have been discovered, as the striking of flint or other hard stone against steel, and the use of a convex glass in condensing the sun's rays. Such plans have not only been serviceable in assisting man to prepare his food, but have also led to many useful inventions and discoveries.

It would take long to enumerate the various kinds of service which fire is made to render. If cookery was its first application, its use was early extended to the working of metals and simple manufactures; and, in later times, through the discovery of the power of steam, fire has become serviceable in assisting different modes of locomotion, and increasing man's power in almost every form of manufacture. Brewing, the distillation of spirits and essences, the making of gas from coal, the making of soaps and other chemical products, are in large measure dependent on the application of heat.

Consider how fire is kept in a state of control. Fire-places, grates, furnaces, or braziers are constructed to limit the extent of its heat. Air currents to fan the flames are carefully directed and kept subject to necessary checks, as by means of dampers. These are some of the ways in which fire is made the servant of man. Among other modes in which it is made serviceable we may name the means by which it can easily be produced where desired, as by the invention of lucifer matches, the storing of gas in reservoirs and its conveyance in pipes, the use of mineral and other oils for lighting and heating. Such facilities for making fire available for use involve additional risks if proportionate care be not taken to keep control over them.

This brings us to the question how fire may become our master. There are some forms of this danger which can scarcely be considered absolutely preventible. The lightning from the clouds may strike buildings or other collections of inflammable materials. Some substances stored in close places generate heat by a form of fermentation, and take fire by what is called spontaneous combustion. And again, quickly moving parts of machinery may become over-heated by friction, and ignite inflammable substances in contact with them. It is possible, however, and usual to take precautions which may have the effect of reducing risks of this sort, and so prevent fire on many occasions from becoming the master. Thus, lofty buildings are usually furnished with long metal rods extending above their highest point, and leading down into the ground. The electricity which might be a source of danger is thus often carried down this conductor into the earth and made harmless. Materials likely to generate spontaneous combustion should be disturbed and ventilated at intervals; and machinery subject to great friction should be properly oiled before being put in motion, and afterwards cooled from time to time with water.

When fire gains the mastery over man it is most commonly through some act of carelessness, arising often from a want of thought as to the ease with which combustion may be caused, and the speed with which it may then pass beyond control. The careless use of matches, ignorant or random meddling with lamps for burning paraffin or petroleum, negligence of gas escaping from a pipe, or foolish search for the escape with a light, are among the frequent causes of destructive fires. Means have been devised for lessening the risks from such accidents as these; as for example, the invention of safety matches which will ignite only on a specially-prepared surface, and of lamps so constructed that the flame is extinguished by disturbing them. In referring to the careless use of matches we are reminded that a former Chancellor of the Exchequer proposed to place a small tax on lucifer matches, but was led to abandon it by an outcry against it as a tax on industry. It is possible, however, that such a tax, by causing greater care in this matter, might have done indirectly far more good in the prevention of fires than harm in diminishing the production of matches.

Sometimes (but we trust this is a comparatively rare occurrence) fires have been intentionally caused for the purposes of revenge or gain. This, which is called arson or incendiarism, is very properly regarded by the law as a criminal offence and subjects the offender, if convicted, to severe punishment. If we only think of the terrible consequences to innocent people which an action of this kind may involve, we cannot too strongly condemn its wickedness.

The cases are probably more frequent where fire gains the upper hand, and causes much loss and damage, through a kind of criminal carelessness; as when a thoughtless mother leaves helpless children within reach of fire, or when a foolish person under the bad influence of drink smokes his pipe in the midst of inflammable materials. Only a short time ago three little children were burnt to death in St. Pancras through the former of these causes.

It is the danger of fire becoming our master through acts of carelessness that makes it so important that the truth and full meaning of the common proverb should be impressed on the minds of children as well as adults. But when all is done that is possible in the way of instruction, and in the form of preventive contrivances, fire will continue on occasions through accident and want of human foresight to gain the mastery over human agency. It is then that means for regaining control become important. For this purpose many plans have been adopted. Most towns are supplied with a Fire Brigade, a band of men either paid officers or volunteers who undertake the task of putting out any fire that may occur in their district. They are provided with fire-engines and hose or pipes to throw a stream of water on the flaming materials. They have ladders and fire-escapes also to rescue if possible any persons who may be in the buildings on fire. To give them a chance of success in their task a good supply of water is necessary, and in every well-managed town care is taken that abundance of water shall be easily accessible for the extinction of fires.

In the beginning of a fire it is often possible to put it out and to save life by the use of smaller means, such as the fire extincteurs and hand grenades which have been devised for throwing on the flames a chemical composition which will not support combustion. A large and interesting collection of contrivances for preventing the destruction of life and property by fire was recently on view at the Fire-Rescue Exhibition in London; but of these the tale would be too long to tell here.

We ought not, however, to conclude this essay without some reference to Fire Insurance. This is a plan by which persons whose property may be accidentally burnt may yet guard themselves against absolute loss. By paying a small annual charge varying for different places according to the estimated risk of fire, one may secure in the event of accidental fire the payment from the funds of an Insurance Company of such a sum as may at least partly compensate for the damage done. This is a form of co-operative security to which every prudent householder should give attention. The establishment of such societies for defence against the tyrannical mastery of fire is one of the most practical lessons derived from the familiar proverb which forms our text.

(To be continued.)

Practical Needlework in Elementary Schools.

BY MISS J. W. WARREN,

Inspectress of Needlework to the Leicester School Board.

As I have promised to keep close to the Government requirements in these papers, I shall, at the risk of repeating myself, remind my readers that, up to now, I have explained the work below Standard I. This belonging to an Infants' School proper, the drills I have written out, up to hemming inclusive, are for Infants. In a good school much more can be done than mere strip hemming, and should be attempted, but all coarser or finer material than that described should be avoided. Pocket handkerchiefs and plain towels may be hemmed, also pinafores. The 18 inch strips may be made into driving reins for the babies' rooms, or, when sewn together by the elder children, will serve for stays; in which case they should be lined with flannel or soft plain knitted cotton strips. Directly the children in a class can do the running stitch with some success, their pieces should be retained and examined by Head Teacher in her monthly or bi-monthly examination. This plan serves two ends—one, to correct untidy work; the other, to encourage careful effort. The best should be given to each child for its home, when not wanted. The different drills, plans of progress and stepping stones with reference to needlework should be written up somewhere in the School so that teachers lose no time in learning the methods, but can at once follow the order of work, and thus aim at the general good. Unity of method is nowhere more necessary than in this all-important hand work, and it should go through each class, from the lowest to the highest. The most careful teachers should be chosen for the stitch, and other drills. If coloured cottons are used, then at least the two highest should be in each class, so that a proper grading may be effected. Time is saved by dividing a class into upper and lower divisions, giving the lower red, and the upper blue, cotton. The blue will probably work by themselves a few stitches while the teacher goes through the stitch orders in red.

The strips, &c., should never be fixed in class time. In some schools this is very general, but no other lesson is ever attempted in this way. Young teachers should remember that every moment spent with a pupil is wasted and lost to such, if not given up solely to teaching and instruction. The plan of preparing work while a child is 'going on,' is quite as absurd as it would be to take a Buffon to read when giving a lesson on the camel or antelope.

A plain sampler, of moderately fine Java canvas, on which the hemming stitch to standard size is worked, might be done by all the upper infants. The threads, of course, would be counted, and the regular slope of stitch ensured. As the Kindergarten so greatly aids needlework by the beauty of material, variety of work, and interest excited, there remains but little to be desired in the way of reform in needlework. We will now go on to consider the needs for a 1st Standard plan, which is but a very little advance upon previous work, and will occupy a very short space indeed.

In regard to the preparation of Infants for the annual Government Inspection, while being no blind worshipper of code Inspectors, I still think that they should be studied so far as to make the work as pleasant as possible. The little prepared strips should be within reach of each class so that no time be lost, and another important thing is that a different material be not given; this ridiculous plan is fatal to success. Plain hemming looks better on coarse light coloured holland than perhaps on any other material, and this should be used once a month, at least, if intended for examination. Girls' mistresses will often save their scraps if asked to do so. The needles and cottons should be the same as those used always, and in no case should children be hurried—no uneasy mind will obey ever such willing fingers; the nervous irritability will be worked out in fantastic stitches. I need scarcely add in concluding suggestions on this part of my papers that every class below the hemming classes should be prepared to go through the means of work by their drills, plays, songs, &c. None of this lower work will be despised by an examiner who understands his mission. A day now and then during the school year should be set apart for a visit from parents previously invited to see their children taught. More sympathy is sadly needed in this direction; besides, when they are helped to see the regularity and management needed for teaching needlework they will cease to complain that their children are not permitted to take miscellaneous articles from home to sew, patch, darn, and the like.

Standard I.—*Hemming, seaming, felling any garment or other useful article which can be completed by the above stitches,* e.g., *pinafore, pillow slip, or pocket handkerchief. In small, mixed, &c., &c.*

I then turn to revised instructions, and find that in the *hem* alone we must show a join. In this Standard are therefore given three new things to teach—seaming, felling, joining. Beginning on, and fastening off and fixing should certainly belong to this Standard too, but I will describe only those actually asked for.

Plan.—Keep still for some months to the coarse brown calico suggested before; dispense (in hemming) with spots, stripes, or black cotton. Take, in place of black, a white or rose pink, so keeping three colours going. Change your cotton in size to *Nos. 40 or 50,* and use *sizes 7 or 8 in needles,* betweens or ground downs.

It will be well, too, if the calico is cut parallel with the selvege, as it keeps more smooth, and cut by thread, when time and stuff allow.

Cut your calico strips for general practice larger than those for specimens. Remember that we have to get in garments, and some training is necessary in order that children may deal with larger pieces satisfactorily. 14 by 4 will be found a good size for the plain hemming. These will admit of four joinings in the long sides, giving eight for practice in the whole strip. Each strip should be carefully fixed by the teachers with the ¼ inch hem, and will last about a month. The name of the child should be written in ink upon each strip.

The hem should first be taught for some few weeks independent of the join as it may chance that even the upper part of Standard I. are unfamiliar with your exact slope of stitch and method of work. They should do this with red cotton, and after working two or three inches the teacher should cut each needleful off about a half inch from the work. Let children well examine this thread; it comes out *above* the *hem-fold.* Now with the needle's point carefully lift this fold a little and find the cotton like a small bar running through; this can be caught by the needle's point and pulled through so as to come *under* the fold. The end is now ready for the new joining to be begun, the needle must now be threaded with blue cotton, the work on the finger exactly as for plain hem but the position of the needle to be just reversed, that is pointing over the hem fold to the *right.* Now slip the point under the hem and try to put it through the upper fold exactly *where the small end was* before you pulled it through; draw it carefully through towards the right and from you until the end is the same length as the end of red already lying under the fold. Both these ends must now with the needle be arranged pointing to the left, lying not under but just peeping *from under* the edge of fold, and each of the next six hem stitches must take them up in working. This is in simple matter of fact what has to be done, but it needs still further explanation if to be of any practical use.

SHEET III.

HEMMING DRILL. No. 7.	SEAMING DRILL. No. 8.	STITCHING DRILL. No. 9.
1. Take a piece at the bottom and top, needle pointing to left over top of hem. Push through to middle of needle.	1. Take a piece of each fold from the back; push needle to its middle, pointing direct to the chest.	1. Put needle in where cotton comes out and bring it 2, 3, or 4 threads (as directed).
2. Move right hand thumb and finger just over piece taken up.	2. Move thumb and finger to the front of this piece on needle. (Curve the hand.)	2. Move finger and thumb over to front as in other stitches.
3. With thimble push needle through right to its eye (still holding needle).	3. With thimble push needle through, guiding it with finger and thumb.	3. Push needle through a little further (not to eye).
4. Lift thimble, and pull needle through as far as cotton will go over left shoulder.	4. Draw needle through close to ear, right.	4. Draw it through, lifting thimble—direction as in hemming.
5. Arrange thimble and cotton again as in combination drill.	5. Arrange thimble again; cotton will be in place.	5. Place thimble and arrange cotton.
6. Place point of needle in position for another stitch.	6. Bring hand to front, and place needle for the other stitch.	6. Prepare needle for the next stitch.

NOTE.—Directions 2, 3, and 4 in all these drills will become one in course of time, but on no account allow this at first. Great attention should also be paid to the direction of cotton (4) in each drill; it will be seen that in Hemming and Seaming it differs. In Stitching, the needle should not be pushed as far as the eye, as the contact of thimble, &c., will tend to make the work dirty.

I have preferred to make the first order in each stitch drill *the actual making of stitch.* *Work placing* and *combination drills* would, of course, precede this order, but differ too much to be made apart, save as given in directions 5 and 6.

The left hand must in no case move except in the almost mechanical action required to bring fresh material under needle.

Tests in Mental Arithmetic.

STANDARD I.

1. Add together 9, 8, 7, and 6. 30.

2. Into how many fives can I place 30 books? 6.

3. Into how many tens can I put them? 3.

4. Four boys and three girls divided 42 nuts equally; how many did each child get? 6.

5. How many sixes are the same as eight threes? 4.

6. Take 4 times 12 from 60. 12.

7. What does 12 mean? Two and ten.

8. Give another name for 12. A dozen.

9. What is the cost of 3 dozen oranges at 4 a penny? 9d.

10. How many farthings are there in three pence halfpenny? 14.

11. What would 14 lemons cost at sixpence a dozen? 7d.

12. How many days are there in a month? 28.

STANDARD II.

1. Five girls took eight nuts each; how many were left out of half a hundred? 10.

2. How much would half a hundred cost at 20 a penny? 2½d.

3. How many dozen are there in 3 score? 5.

4. What is the half of 5 + 6 + 7? 9.

5. If 5 marbles cost a halfpenny, how many could you get for 9d.? 90.

6. What is the cost of 4 lbs. of sugar at 3½d. a pound? 1s. 2d.

7. What change would be received out of a florin? 10d.

8. How many florins are equal to 6 crowns? 15.

9. Three boys saved a crown; how much did each save, if they saved equally? 1s. 8d.

10. How many minutes are there in three quarters of an hour? 45.

11. If a quarter of a pound of tea cost 9d., how much is that per lb.? 3s.

12. If 1½ lbs. cost 3s., what does a lb. cost? 2s.

STANDARD III.

1. How many oranges must be cut up so that 50 children may have a half each? 25.

2. What is the half of the fourth part of a sovereign? 2s. 6d.

3. Find the cost of 4 score eggs at 10 for a shilling. 8s.

4. What is the value of 72 books at half-a-crown a dozen? 15s.

5. How much would 1½ lbs. of mutton cost at 11d. a pound? 1s. 4½d.

6. What change would be received out of a double florin? 2s. 7½d.

7. If ¾ lb. of lamb cost 9d., how much would 2 lbs. cost? 2s.

8. If the railway fare for a journey is 3s. 6d., what is a fare and a half? 5s. 3d.

9. How many seconds are there in half an hour? 1,800.

10. A boy wastes ¼ hour a day; how much is that in 3 weeks? 5¼ hours.

11. How many lbs. are there in 3½ stone? 49.

12. How many half-ounces are there in 1½ lbs.? 48.

STANDARD IV.

1. What is the eighth part of a gross? 18.

2. Find the cost of 18 articles at 3s. 9d. a dozen. 5s. 7½d.

3. How much would a boy save in October, November, and December, if he save a penny a day? 7s. 8d.

4. How many more days must he save to have a sovereign? 148.

5. A man works 8 hours a day, and receives 7d. an hour; what are his week's wages? £1 8s.

6. If 6 nuts weigh an ounce, how many are there in 2½ lbs.? 240.

7. What would they cost at 1½d. for two dozen? 1s. 3d.

8. Find the value of 3 stone of potatoes at 2 lbs. for a penny. 1s. 9d.

9. What is the cost of an ounce of tea at 3s. 8d. per lb.? 2¾d.

10. If a gallon of beer cost 1s. 8d., what is the cost of a pint? 2½d.

11. How much would half a mile of ribbon cost at eight yards a penny? 9s. 2d.

12. How many pieces of board 3 inches long can be cut from a piece 2¼ yards in length? 27.

STANDARD V.

1. Find the difference between $\frac{4}{5}$ and $\frac{7}{10}$. $\frac{1}{10}$.

2. What is the sum of $\frac{4}{5}$ and $\frac{7}{10}$? 1½.

3. After giving away a quarter of his marbles a boy had 15 left; how many had he at first? 20.

4. What is the smallest number of apples that can be arranged in fours, sixes, or eights? 24.

5. How much would a gross of books cost at 3½d. each? £2 2s.

6. A and B had 17s. between them, and A had 5s. myre than B; how much had B? 6s.

7. A square piece of board contains 25 square yards; how many feet long is a side? 15.

8. How much is five-thirds of a sovereign? £1 13s. 4d.

9. If 9 articles cost 3s. 9d., what would 17 cost? 7s. 1d.

10. What is the simple interest on £350 at 6 per cent. for 3 months? £5 5s.

11. Find 5 per cent. on £79 13s. 4d. £3 19s. 8d.

12. An article which cost 4s. was sold for 5s.; what was the gain per cent.? 25 per cent.

STANDARDS VI. AND VII.

1. If $\frac{4}{5}$ of the length of a room is 27 feet, what is the length of the room in yards? $11\frac{1}{4}$.
2. Take $1\frac{7}{12}$ from $3\frac{3}{8}$. $1\frac{19}{24}$.
3. Bring $\frac{5}{11}$ to a decimal. ·45.
4. Divide ·009 by ·3. ·03.
5. What must ·03 be multiplied by to make 30? 1,000.
6. If an article cost £7, what would ·85 of it cost? £5 19s.
7. What is the commission on £890 at $1\frac{1}{2}$ per cent.? £13 7s.
8. Find the simple interest on £30 for 3 years at 3 per cent. £2 14s.
9. What is the interest on £650 for 219 days at 4 per cent.? £15 12s.
10. Reduce $\frac{5}{8}$ of a shilling to the decimal of half-a-crown. ·25.
11. A shopkeeper sold a hat for 7s. 6d., and lost 25 per cent.; how much did it cost? 10s.
12. If it had been sold for 7s., what would have been the loss per cent.? 30.

——o——

Model Answers to Certificate Questions, Christmas, 1887.

Male and Female Candidates.

SECOND YEAR.

Latin.

Male Candidates may answer questions in *two* Languages; *Female* Candidates in *one* only.

TWO *hours allowed for this Paper for Male Candidates;* THREE *hours for Female Candidates.*

SECTION I.

1. Translate into English :—

(*a*) Anno ante me censorem mortuus est, novem annis post meum consulatum, quum consul iterum, me consule, creatus esset. Num igitur, si ad centesimum annum *vixisset*, senectutis eum suæ pæniteret? Nec enim excursione, nec saltu, nec eminus hastis aut cominus *gladiis* uteretur, sed consilio, ratione, sententia. Quæ nisi essent in senibus, non summum consilium majores nostri appellassent senatum.

(*b*) O præstans animi juvenis quantum ipse feroci
Virtute exsuperas, tanto me *impensius æquum est*
Consulere, atque omnes metuentem expendere casus,
Sunt tibi regna patris Dauni, sunt oppida capta
Multa manu; necnon aurumque animusque Latino est;
Sunt aliæ innuptæ Latio et Laurentibus agris,
Nec genus *indecores*. Sine me hæc haud mollia fatu
Sublatis aperire *dolis*; simul hæc animo hauri.

(*c*) Inclusas ut cum latebroso in pumice pastor
Vestigavit apes, fumoque implevit amaro,
Illæ intus trepidæ rerum per cerea castra
Discurrunt, magnisque acuunt stridoribus *iras;*
Volvitur ater odor tectis: tum murmure *cæco*
Intus saxa sonant: vacuas *it* fumus ad auras.

2. Parse the words printed in italics.

4. Decompose into their separate parts—*inclusas, respublica*, and trace the origin of *tragœdias, avidus, habilis.*

5. In what metre did Virgil write? How many feet are there in his lines? Of what kind are they? Scan the first three lines of extract (*c*), marking the quantities of each syllable.

(1) (*a*) He died the year before I was censor, nine years after my consulate, having been elected consul for the second time, when I held the same office. You do not think then that if he had lived to be a hundred, his age would have been a matter of regret to him? Instead of running, of leaping, of the thrust of the sword, the cast of the spear, he would have employed wisdom, reason, judgment. Unless these gifts resided in the old, our forefathers would not have named the supreme council the 'assembly of elders.'

(*b*) O gallant hearted youth, the more you abound in impetuous valour, the more behoves it that my prudence be untiring, that my caution weigh all possible issues. You have the kingdom of your father Daunus, and many a captured town, Latinus too has gold and a generous heart. Other maidens there are in Latium and the land of Laurentum, maidens not unworthy of you in birth. Suffer me to lay concealment aside and give plain utterance to these hard sayings, and be not deaf to this besides.

(*c*) As, when a shepherd has traced bees to their fastness in a cranny of the rock, and filled it with pungent smoke, the bees within rush in wild alarm about their wax built fortress, and whet their rage with loud buzzing. The black foul vapour rolls through their dwelling, then the hollow rock sounds with their stifled hum; the smoke escapes to the free air.

(2) *vixisset*—3rd sing., pluperf., subj., act., vivo, vivere, vixi, victum.
gladiis—abl. pl., *gladius*, masc., 2nd declens., gov. by *uteretur*.
impensius—comparat., neut., sing., used adverbially, from positive adv. *impense*, derived from the past participle pass. of *impendo*.
indecores—nom., fem., plural, from adj. *indecor* or *indecoris*.
Sublatis—abl., plur., mas., past participle, passive, from *tollo, sustuli, sublatum*, agreeing with *dolis* (ablat. absolute).
dolis—abl., plur., masc., from *dolus*, subst., 2nd decl.
Vestigavit—verb, act., perf., ind., 3rd sing. (subject *pastor*), *vestig-o, -are, -avi, -atum* (1st conjugation).
iras—acc., fem., pl., object of *acuunt* from *ira* (1st decl.)
Volvitur—verb, middle or passive, pres. ind., 3rd, sing. (subject *odor*), *volvo, volvere, volvi, volutum.*
cæco—adj., neut., sing., abl., agreeing with *murmure.*
it—verb, act., pres., indic., 3rd, sing. (subject *fumus*), *eo, ivi* (*ii*), *itum, ire.*

(4) *inclusas*, compounded from *in* and *clusas* (*clausus*) past part. pass. of *claudo*.

respublica, really two words *res* (subst.), *publica* (adj.)

tragœdia, a Greek word borrowed τραγῳδια from τράγος (goat) and ᾠδὴ (contracted for ἀοιδὴ from ἀείδω) a song, probably from an early custom of sacrificing a goat with singing of hymns in honour of Dionysus at the vintage feast; in these hymns the beginnings of Greek drama are to be sought.

avidus, from stem of *avere* (verb,) to desire: compare *avarus*.

habilis, from stem of *habere* (verb), to hold: that which can be held or handled readily, like English handy.

(5) Virgil wrote in hexameters, lines of six feet, either dactyls or spondees.

Inclū|sās ŭt |cūm lătĕ|brōsō in |pūmĭcĕ |pāstŏr |
Vēstī|gāvĭt ă|pēs, fū|mōquē im|plēvĭt ă mārō |
Illæ̅ in|tūs trĕpĭ|dæ̅ rē|rūm pĕr |cērĕă |cāstră |

Male and Female Candidates.

SECOND YEAR.

Latin.

SECTION II.

Translate into Latin :—

(*a*) He carried on war with the spirit of youth (as a young man) though plainly advanced in years.

(*b*) Plato died in his 81st year still composing (writing).

(*c*) But who am I, and what power do I possess?

(*d*) All things they care about, they remember.

(*e*) No one is so old as not to reckon he may live a year.

(*f*) The orator, I fear, may grow languid in old age; for his function is one not merely of intellect, but of lungs too, and strength.

(*a*) Hic bella gerebat ut adolescens, cum plane grandis esset.
(*b*) Plato uno et octogesimo anno scribens mortuus est.
(*c*) Sed quis ego, quidve possum?
(*d*) Omnia, quæ curant, meminerunt.
(*e*) Nemo est tam senex, qui se annum non putet posse vivere.
(*f*) Orator metuo ne languescat senectute. Est enim munus ejus non ingenii solum, sed laterum etiam et virium.

Male and Female Candidates.

SECOND YEAR.

Latin.

SECTION III.

1. Explain these expressions—Sapientissimus quisque: Sed quid opus est plura? Quorsus igitur hæc tam multa de Maximo? Senectutis eum suæ pænitebit. Fenerari pecuniam.

2. What are deponent verbs? Give instances.

3. Distinguish the uses of *ita* and *tam*; *multum* and *diu* in the phrase 'cum multum diuque vixeris;' *opes* and *copiæ*.

4. '*Faciam ut potero.*' How should we render this in good English? '*Ut in homine Romano.*' How is *ut* used here?

5. Give the derivation of the following adjectives, and explain the full force of their terminations—*verax, tolerabilis, sanguineus, lacrimosus.*

Give two more instances of each class.

(1) *Sapientissimus quisque.*—'All wise men;' literally each wisest man.

Sed quid opus est plura?—'But why go on?' The original form of the expression is found in '*opus est gladio.*' 'There is work (to be done) with a sword;' *gladio* being an instrumental ablative. This being equivalent to saying 'A sword is necessary,' the true meaning of *opus* was forgotten, and the word treated as an indeclinable adjective with meaning of 'necessary.'

Quorsus hæc, etc.—'What is the object of this long discourse about Maximus? *Quorsus* is contracted for *quo-versus*, lit. 'Whither directed?' that is 'with what end in view?'

Senectutis, etc.—'He will regret that he has lived to be an old man,' the impersonal verb *pænitet* is followed by a genitive of the object, and an accusative of the person feeling the emotion.

Fenerari pecuniam.—'To lend money at interest.' *Fenerari* is a deponent verb, formed from the substantive *fenus* (interest, usury), from *fe- feu-* (Greek φυ); compare *fe-tus, fe-cundus.* The notion that the interest is the *child* of the capital is seen also in the Greek word τόκος.

(2) Deponent verbs are really survivals of the middle voice in Latin, as *ulciscor*, I avenge myself; *vescor*, I feed myself.

(3) *Ita* is used in expressions of *manner*. *tam* in expressions of degree: *e.g. ita bonus est* means 'his goodness is shown in such a way;' *tam bonus est* 'his goodness is so great.'

Multum vivere means 'to live a great deal,' *i.e.* to live an active occupied life. *Diu vivere* means simply to live a long life.

Opes has its nearest parallel in English in the word 'means;' wealth or resources of any kind looked at as means to an end to be obtained. *Copiæ* rather corresponds to 'riches;' the emphasis being laid on the notion of 'abundance.' The two words are however of the same etymological origin, *cōpia* being a contraction for co-ŏp-ia. *Copiæ* has also the special meaning of military forces, in which *opes* is not used.

(4) 'I will do what I can.'

Ut in homine Romano.—The *ut* here qualifies a verb implied, *e.g. fit*, and adduces a fact which must be allowed for in making the main statement. The literal meaning is 'in proportion to what (usually) happens in the case of a Roman.'

(5) *Verax.*—Stem *ver-*; the suffix *-ax*, of 'inclination,' 'propensity;' *cp. loqu-ax, pugn-ax.*

Tolerabilis.—Stem *tolera-*, extension of stem *tol-*, with the meaning of 'lift,' 'carry.' Suffix *-bilis*, of 'possibility;' *cp. lacrima-bilis, affa-bilis.*

Sanguineus.—Stem *sanguin-* 'blood.' Suffix *-eus* generally of the material of a thing; *cp. ferr-eus, aur-eus.*

Lacrimosus.—Stem *lacrim-* cp. Greek δακρυμ-α. Suffix *-osus* meaning 'fullness,' *cp. verb-osus, anim-osus.*

Male Candidates.

FIRST YEAR.

Greek.

Male Candidates may answer questions in *two* Languages.
Two *hours allowed for this Paper.*

SECTION I.

1. Translate into English:—

Πρὸς ταῦτα μεταστάντες οἱ Ἕλληνες ἐβουλεύοντο καὶ ἀπεκρίναντο· Κλέαρχος δ' ἔλεγεν Ἡμεῖς οὔτε συνήλθομεν ὡς βασιλεῖ πολεμήσοντες, οὔτε ἐπορευόμεθα ἐπὶ βασιλέα· ἀλλὰ πολλὰς προφάσεις Κῦρος εὕρισκεν, ὡς καὶ σὺ εὖ οἶσθα, ἵνα ὑμᾶς τε ἀπαρασκευάστους λάβοι καὶ ἡμᾶς ἐνθάδε ἀναγάγοι. Ἐπεὶ μέντοι ἤδη ἑωρῶμεν αὐτὸν ἐν δεινῷ ὄντα, ᾐσχύνθημεν καὶ θεοὺς καὶ ἀνθρώπους προδοῦναι αὐτόν, ἐν τῷ πρόσθεν χρόνῳ παρέχοντες ἡμᾶς αὐτοὺς εὖ ποιεῖν. Ἐπεὶ δὲ Κῦρος τέθνηκεν, οὔτε βασιλεῖ ἀντιποιούμεθα τῆς ἀρχῆς, οὔτ' ἔστιν ὅτου ἕνεκα βουλοίμεθ' ἂν τὴν βασιλέως χώραν κακῶς ποιεῖν· οὐδ' αὐτὸν ἀποκτεῖναι ἂν ἐθέλοιμεν, πορευοίμεθα δ' ἂν οἴκαδε, εἴ τις ἡμᾶς μὴ λυποίη· ἀδικοῦντας μέντοι πειρασόμεθα σὺν τοῖς θεοῖς ἀμύνασθαι· ἐὰν μέντοι τις ἡμᾶς καὶ εὖ ποιῶν ὑπάρχῃ, καὶ τούτου εἴς γε δύναμιν οὐχ ἡττησόμεθα εὖ ποιοῦντες.

2. Parse πολεμήσοντες, οἶσθα, ᾐσχύνθημεν, πρόσθεν, ἀρχῆς, ὅτου, ἀμύνασθαι.

(1) Thereupon the Greeks held a consultation apart, and, Clearchus being their spokesman, made this reply: For our part, we neither assembled our force for war against the Persian king, nor was our march directed against him: but Cyrus, as you know as well as we, kept inventing fresh pretexts, that he might catch you unprepared, and bring us up the country to this place. When however we presently began to see the danger of his situation, we thought it shame before gods and men to desert him, we who previously offered ourselves to him for his service. But now that Cyrus is dead, we neither lay claim to any part of the king's dominion, nor have we any motive for injuring the king's territory; nay, we would not seek his life, but would march homeward, if we were safe from annoyance. Aggression on the other hand we will endeavour with the help of heaven to repel: whilst if anyone is kind enough to render us any service, we will repay the obligation in full measure, as far as our ability allows.

(2)

πολεμήσοντες.	fut. part, act., from πολεμέω, nom., pl., mas.
οἶσθα.	2nd, sing., indic. of οἶδα, a perfect form from stem ἰδ.
ᾐσχύνθημεν.	1st, plur., 1st aor., indic., passive from αἰσχύνω.
πρόσθεν.	Adverb of time.
ἀρχῆς.	Gen., sing., fem., 1st decl. from ἀρχή.
ὅτου.	Gen., sing., neut., relative pronoun from an older form of ὅστις.
ἀμύνασθαι.	1st aor., inf., middle, from ἀμύνω.

SECTION II.

Translate into Greek:—

(*a.*) A certain man had two daughters and three sons.
(*b.*) I am also of that opinion.
(*c.*) On the following day he said nothing; but on the third he spoke.

(*d.*) Tissaphernes will break down the bridge in the course of the night.

(*e.*) I am the man whom you seek.

(*f.*) As the sun was setting, he called together the Generals of the Greeks.

(*a*) *εἶχέ τις δύο θυγατέρας καὶ τρεῖς υἱούς.*

(*b*) *δοκεῖ κἀμοὶ ταῦτα.*

(*c*) *τῇ μὲν ὑστεραίᾳ ὀυδὲγ ἔλεγεν· τῇ δὲ τρίτῃ εἶπεν.*

(*d*) *ὁ Τισσαφερνης τὴν γέφυραν τῆς νυκτὸς λύσει.*

(*e*) *αὐτός εἰμι ὃν ζητεῖς.*

(*f*) *ἡλίου δύνοντος συνεκάλεσε τοὺς τῶν Ἑλλήνων στρατηγούς.*

SECTION III.

1. Name any exceptions to the general rule that nouns in *-ος* not increasing in the genitive are masculine. Decline *διώρυξ, ἄναξ, γυνή.*

2. Give the future, aorist, and perfect of *βαίνω, γιγνώσκω, ἔρχομαι, θνήσκω.* Give the 1st and 2nd aorists of *ἵστημι,* and *τίθημι,* and state the difference in the usage of them.

3. Name four derivatives from *στρατός,* and explain accurately how they are formed.

4. Give instances of adverbs used with the article, and state the meanings. How should you translate *το ἡδύ, το καλόν, τὸ κακόν.*

5. Give the comparatives and superlatives of *μέγας, μικρός, μάλα, πολύ, κακῶς.*

6. Relate the circumstances of the death of Clearchus: and state two reasons for supposing that Proxenus the Bœotian was a personal friend of the author.

(1) *ὁδὸς, κέλευθος, νῆσος, νόσος,* are all feminine; so too names of towns, as *Κόρινθος.*

	Sing.	Plur.	Dual
N. and V.	*δίωρυξ*	*διώρυχες*	*διώρυχε*
Acc.	*διώρυχα*	*διώρυχας*	*διώρυχε*
Gen.	*διώρυχος*	*διωρύχων*	*διωρύχοιν*
Dat.	*διώρυχα*	*διώρυξι*	*διωρύχοιν*

	Sing.	Plur.	Dual
N.	*ἄναξ*	*ἄνακτες*	*ἄνακτε*
V.	*ἄναξ* or *ἄνα*	*ἄνακτες*	*ἄνακτε*
Acc.	*ἄνακτα*	*ἄνακτας*	*ἄνακτε*
Gen.	*ἄνακτος*	*ἀνάκτων*	*ἀνάκτοιν*
Dat.	*ἄνακτι*	*ἄναξι*	*ἀνάκτοιν*

	Sing.	Plur.	Dual
N.	*γυνὴ*	*γυναῖκες*	*γυναῖκε*
V.	*γύναι*	*γυναῖκες*	*γυναῖκε*
Acc.	*γυναῖκα*	*γυναῖκας*	*γυναῖκε*
Gen.	*γυναικὸς*	*γυναικῶν*	*γυναικοῖν*
Dat.	*γυναικὶ*	*γυναιξὶ*	*γυναικοῖν*

(2)

Present	future	aorist.	perfect
βαίνω	*βήσω* (trans.) *βήσομαι* (intrans.)	*ἔβησα* (trans.) *ἔβην* (intrans.)	*βέβηκα.*
γιγνώσκω	*γνώσομαι*	*ἔγνων*	*ἔγνωκα.*
ἔρχομαι	*ἐλεύσομαι*	*ἦλθον*	*ἐλήλυθα.*
θνήσκω	*θανοῦμαι*	*ἔθανον*	*τέθνηκα.*

ἵστημι 1st aor. *ἔστησα,* transitive, 'I placed.'
2nd aor. *ἔστην,* intransitive, 'I stood.'
τίθημι 1st aor. *ἔθηκα,* transitive, rarely used except in the singular.
2nd aor. *ἔθην,* transitive, rarely used in the singular.

(3) *στρατηγὸς* from the stems *στρατ-* and *ηγ-* combined; the *ο* is a stem-suffix, the *ς* the inflexional suffix for the nominative case.

στρατιώτης from stem *στρατ-* by addition of termination *-ιωτ* expressing agency: the *η* is the stem-suffix; the *ς* the nominative inflexional suffix.

στρατία from stem *στρατ-* by addition of termination *-ια* (= *ι* + stem suffix *α*), with a collective or abstract force.

στρατηλάτης from stems *στρατ-* and *ηλα-* (lengthened from *ἐλα-* verb-stem of *ἐλαύνω*) combined with the termination *-της* (= *τ* + stem-suffix *η* + inflexional nominative suffix *ς*) expressing agency.

(4) *οἱ νῦν* = men of the present. *τὰ ἐκεῖ* = matters yonder.

οἱ πάνυ = men of rank or influence. *τὸ μεταξὺ* = the interval.

τὸ ἡδὺ = sweetness, delightfulness.

τὸ καλὸν = beauty; so, of moral beauty = goodness.

τὸ κακὸν = evil, mischief.

	Positive.	Comparative.	Superlative.
(5)	*μεγας,*	*μέιζων,*	*μεγιστος.*
	μικρὸς,	*μικρότερος,*	*μικρότατος*
		μείων	
		ελάσσων,	*ἐλάχιστος*
	μάλα,	*μᾶλλον,*	*μάλιστα.*
	πολὺ,	*πλεῖον,*	*πλεῖστα.*
	κακῶς,	*κάκιον,*	*κάκιστα*
		χεῖρον,	*χείριστα*

(6) The Greeks were on their way back to Ionia, under the treacherous guidance of Tissaphernes. Frequent disturbances took place, owing to the distrust felt towards each other by the Greeks and Persians. Clearchus tried to remedy their unsatisfactory relations by coming to a clear understanding with Tissaphernes. The latter met him with apparent frankness, and invited him to come the next day to his tent, with the other Greek generals and officers, promising to reveal then the names of the persons whose calumnies were the cause of this mutual distrust. Clearchus fell into the snare, and went to Tissaphernes with four other generals and twenty inferior officers. (*λοχαγοί*). The generals were admitted to the tent, the rest remained outstde. At a given signal the officers outside were overwhelmed and put to the sword; the generals were arrested, sent to the court of Persia, and shortly after beheaded.

(*a*) Xenophon, in the first chapter of Book III., says that Proxenus was an old friend of his (*ξένος ὢν ἀρχαῖος*); and it was on Proxenus' persuasion that Xenophon joined the army of Cyrus as a Volunteer.

(*b*) In chapter four of the Second Book we are told of an occurrence which happened to Xenophon and Proxenus, as they were taking a walk in front of the camp near Sittake, one evening after supper.

Notes of a Lesson on the arrangement of the Smaller Bodies of the Planetary System.

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INFORMATION TO BE TAUGHT.

A. Moons or Satellites.

1. **The Earth has one satellite which we call the moon.**

(*a*) The moon revolves round the earth at a distance of 238,000 miles **in a little less than 30 days.**

(*b*) It shines by reflected sunlight, and owing to the different positions it takes with respect to the Earth the illuminated portion presents a constantly changing appearance giving rise **to the Phases of the Moon.**

2. Jupiter has four satellites, each about as large as the moon.

(*a*) These move round the planet with great rapidity. Although the nearest satellite is nearly as far from Jupiter as our moon is from the Earth, **it rushes the entire distance round the planet in less than two of our days.**

(*b*) Jupiter and its four satellites act as a clock in the heavens, and sailors and other travellers are able to find Greenwich time in any part of the world, when one of the satellites is seen to pass behind the planet.

ILLUSTRATIONS AND TEACHING HINTS.

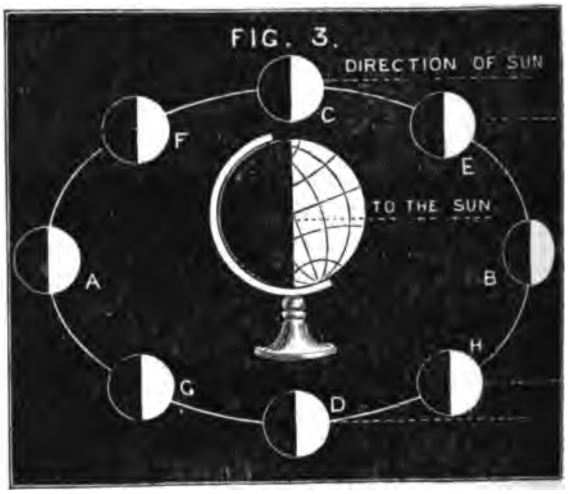

Fig. 1. Diagram illustrating the different positions occupied by the moon in one revolution round the Earth.

Refer again to the diagram above. The moon at the position marked A appears to be a full, bright orb, but at B no moon can be seen. If the moon were self-luminous, its appearance would be the same in both positions.

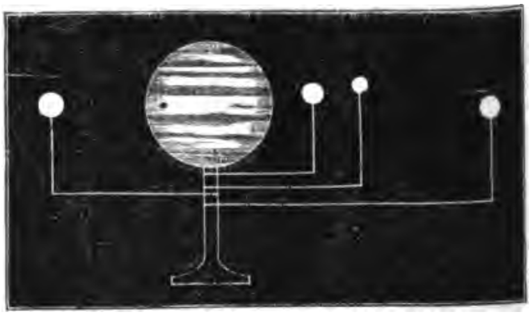

Fig. 2. Diagram of model used to illustrate the position and movements of the satellites of Jupiter.

(*a*) Contrast the movement of the moon round the Earth in 30 days with the much more rapid movement of the moons of Jupiter. The rapidity of movement will be further impressed by stating that the moon moves round our earth at above 2,000 miles per hour.

(*b*) Place a light in front of the model which represents Jupiter, then move one of the balls representing a satellite until it passes behind the planet. This will illustrate an eclipse. The children must be told that in the real eclipse of a satellite of Jupiter it can be seen to occur over nearly one half the Earth at the same time, *i.e.*, over that half from which the planet is visible.

3. Saturn has eight satellites only one of which is larger than our moon. Like the satellites of Jupiter these moons of Saturn move very rapidly round the planet.

   (*a*) The nearest satellite is about one-third as far from Saturn as the moon is distant from the Earth, it moves the entire course round the planet **in less than one of our days.**

   (*b*) The satellite furthest from Saturn is about nine times as far from its planet as the moon is distant from the Earth, **it travels over one revolution in about 2½ months.**

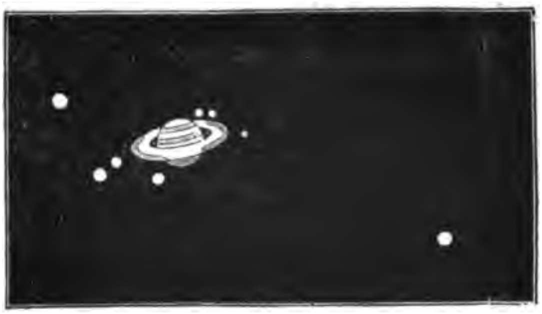

Fig. 3. Drawing to show the position of the eight satellites of Saturn.

(*a*) The great velocity of movement will be apparent if we state how rapidly the moon moves round our Earth.

(*b*) By means of this comparison the class should be impressed with the vast area over which Saturn and its system of moons extends, as well as with the rapidity of the movement of the satellites.

4. The most striking feature in connection with Saturn are the three rings of matter which surround the planet.

   These rings are held by astronomers to be composed of an immense number of small bodies revolving round the planet with very great velocity.

   The difference in the brightness of the rings is due to the particles in the innermost or *dark ring* being few and far apart, whilst in the outer and inner *bright rings* the particles are more numerous and much closer together.

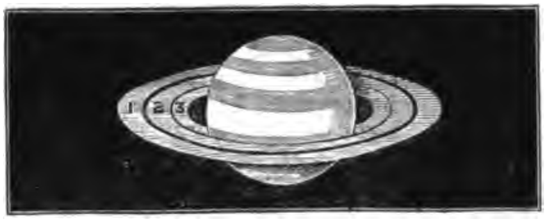

Fig. 4. Saturn and its rings.

3 represents the dark ring.
2 is the inner bright ring.
1 is the outer bright ring.

Lead the class first to the fact that each particle of ring material reflects sunlight. This may be illustrated by reference to the bright dust particles glittering in a beam of sunlight. The same example will also illustrate the fact that the more particles found in a given space, the greater will be the amount of light reflected.

B. Minor Planets or Planetoids.

Between the planets Mars and Jupiter there is a very great distance. In this space instead of one large planet being found as some of the old astronomers predicted, **there are very many small ones called Minor Planets or Planetoids.**

In 1845 only five of these tiny bodies had been discovered but since then additions have been made year by year until now there are known to be more than 250.

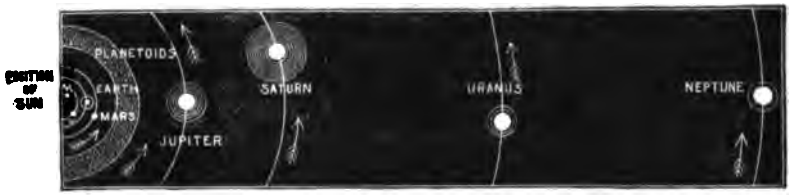

Fig. 5. In the above drawing the space between Mars and Jupiter is seen to be very great when compared with that between the Earth and Mars.

The dotted area represents the position within which most of the minor planets are found to move.

It is interesting to note that these bodies are constantly being discovered; when, however, the scholars are told that a telescope is needed to see them, they will infer their small size. They make up for their want of size by their number.

C. Comets and Meteors.

The remaining bodies which have a close connection with the planetary system are Comets and Meteors.

(*a*) Whilst planets keep nearly the same distance from the sun comets and meteors approach very near at times, and afterwards they remove to immense distances from the sun, and some never return.

(*b*) Planets reflect light, but meteors become self-luminous when, by reason of friction due to their rapid flight through the air, they blaze out and **form what we term shooting stars.**

(*c*) Comets change their appearance very much in different parts of their orbits. When they are far from the sun they seem very small and slowly-moving bodies, but when they approach the sun **their speed is quickened, their tails are lengthened, and they become so hot as to give some light of their own.**

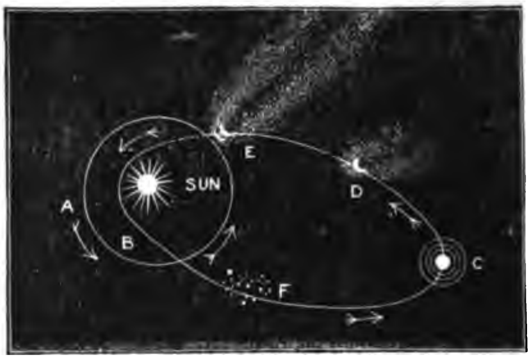

Fig. 6. Comparison between the orbit of a planet and that of a comet E and a group of meteors F.

(*a*) A represents the orbit of a planet. B represents the orbit of a comet.

(*b*) The fact that planets reflect light is shown by the different phases which they manifest. The sudden blaze of a meteor is familiar to all, though the notion of falling stars may need correction. The development of heat by friction should be shown by actual experiment. A string passed rapidly through the closed hand, or simply rubbing the two hands together, will be effective illustrations.

(*c*) Illustrate these changes by a drawing such as Fig. 6. D represents a comet approaching the sun; E is the same comet near the sun. The reason of these changes must be left at present. The facts, however, as represented by the diagram, are interesting, and will be readily remembered.

BLACKBOARD SKETCH.

1. The small bodies which revolve round the different planets **are called Satellites.**
2. The Moon is the Earth's Satellite. It revolves in nearly 30 days. The changes in its appearance are termed **the phases of the Moon.**
3. Jupiter has four Satellites. They move very rapidly. By means of their eclipses **travellers in distant countries can tell Greenwich time.**
4. Saturn has eight Moons. They all move much more rapidly than our moon. Saturn has three rings—**the dark ring, the outer bright and inner bright rings.**
5. The Minor Planets are small bodies revolving round the Sun, chiefly in the space between Mars and Jupiter. **Some of these bodies are discovered every year.**
6. Comets and Meteors differ from Planets in the orbits they occupy, and in being self-luminous.

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

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DIVISION III.—STANDARDS III. AND IV.

Code Requirement.

Note Test.—(Modulator.) To sol-fa from the Examiner's pointing on the modulator, or from dictation, in any key, simple passages in the major diatonic scale, including **fe** and **ta** in stepwise progression, used thus:—**s fe s**—**d' ta l.**

Examples. Key C or D.

(1) **d m s l s m f r s f m s d' t l s fe s f m s d' ta l s l t d' s m d.**

Key F or G.

(2) **d s, m r d t, d r m d ta, l, t, d r m s fe s f r d.**

Note Test.—(Written or printed.) To sol-fa at sight a written or printed exercise, including the notes of the Doh chord in any order, and any other notes of the major diatonic scale in stepwise succession.

Examples. Key C or D.

(1) **d d m r d m s f m s l s l t d'.**

Key F or G.

(2) **s m s d r m f m d t, d s, l, t, d s m r d.**

[The foregoing requirements and examples are quoted from a revised edition* of the Instructions as to Examination in Singing, recently issued by the Scotch Department. As the next edition to be issued by the English Department will probably follow the new Scotch copy, the wording and examples of the latter will be quoted in the remaining papers of this series. The alterations made are chiefly verbal, and the examples of tests are new: the tune tests from Division I. upwards, illustrating the use of the range

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* C 5442, price 2½d.

d to **d^1** (tonic and octave)
and **s_1** to **s** (dominant to dominant)

The necessity for special practice of the dominant range is mentioned in Section 10 (March number, p. 27), and the specimen tune tests hitherto given abundantly illustrate this tonal construction. The alterations for Divisions III. and IV. will be commented on as the various topics are considered.]

84. The modulator work must now include free leaps to and from *any* tone of the major diatonic scale (that is to say, the tones of the Doh, Soh and Fah chords). Most teachers will find it necessary to prepare their voluntaries, or at least to think over them beforehand. Otherwise they may find themselves pointing certain successions over and over again, or trying to avoid this fault by pointing ugly unmelodious successions that quickly cease to interest and instruct pupils. A little practice and careful observation will soon enable a teacher to make voluntaries that are fairly tuneful if they are not absolute tunes. Voluntaries need not always be rhythmic because if uncertain singers have fallen into the swing of a regular pulse they often feel impelled to sing a tone before they have properly preconceived it. But as skill increases it greatly adds to the interest of voluntaries if they have a rhythmic swing, that is, a regular pulse which a teacher can easily establish by designing to do so. Again, phrases that fairly balance one another can be shown by lifting the pointer where necessary. Quick movement from note to note is rarely practicable. Half pulses at the rate of about M. 70 can be followed, especially if they involve repetitions of a rhythmic shape already impressed upon the ear. In constructing such passages it is well to use stepwise movement or to repeat tones already struck.

Specimen Rhythmic Voluntary.

M. 60 or 70. Doh = E.

| d :d | m .f :s | l :l | s :m }
| m .r :d | m .r :d | r :r | m :— }
| s :d^1 | d^1 .t :l | l :l | s .f :m }
| r :r | m .f :s | s_1 :r | d :— ||

Directly the swing of the pulse is established the pointer may anticipate the coming pulse without inconvenience.

It will be observed that the above specimen divides only the stronger pulses and that the rhythm TAA TAA TAATAI TAA comes again and again.

85. No matter how carefully voluntaries are prepared they soon cease to engage the interested attention of pupils if time after time they are sung in precisely the same way, namely, the whole class singing every note the teacher points. Innumerable ways of pitting one section of a class against another will occur to every thoughtful teacher. The interest and emulation evolved by little contests of skill assist the discipline and culture of a class in a surprising manner, and they enable an observant teacher to ascertain the abilities of individuals in the best possible way. In Section 29 several useful methods of varying practice were described. The following are other plans of practice :—

(1) The teacher announces he will point say four notes. The class to notice and recollect what was pointed, and then to sing them.

(2) The class to be divided into two, three, four or more sections. Each section to be responsible for one or more notes, and to sing only these as pointed.

(3) The class to be divided as above. Each section to sing a note in turn, *i.e.*, not look out for one particular tone, but for the one that falls to its turn.

86. Teachers should have some definite intention when pointing. The voluntaries should be designed (1) to practice some particular leap or difficulty, (2) to give fluency, (3) as tests similar to those likely to be applied by the Department.

87. The practice of sol-faaing may be easily overdone, the result being that pupils are incapable of singing at sight very simple passages to words or to the syllable *laa*. It is true that the Code does not require from any Division power to sing tests without sol-faaing. This fact, however, does not affect the more important fact that no really good results even in sol-faaing can be attained unless pupils are accustomed to think and sing without necessarily uttering the sol-fa names.

The utility of laaing in helping pupils to tell ear tests was shown in Sections 64 to 67. It is not, of course, that the syllable *laa* has any special virtue apart from the influence it may exert upon purity and sweetness of voice quality. Any other syllable or syllables that are not the sol-fa syllables will answer the purpose in view. In fact it is better for sight-singing purposes to vary the singing syllables from time to time. Thus the following exercises will be found to be instructive and amusing :—

(1) Follow pointing, using the names of the letters of the alphabet, A to Z, or the names of figures one to ten repeated as necessary.

(2) Follow pointing, using some well-known or easily remembered words over and over again until the end of the voluntary.

Example.

d m s l s m r m f s l s
Sing sweet - ly and clear - ly, sing sweet - ly and clear - ly.
s d^1 t l s m d r m f s m
Sing sweet - ly and clear - ly, sing sweet - ly and clear - ly.

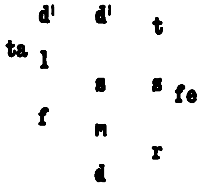
The name of a school or street, &c., will of course equally well answer the purpose.

(3) The teacher sings a short phrase to the sol-fa syllables, and the class replies, singing to laa or other syllables as directed.

(4) If difficult leaps are to be practised it will be best for the class to first sol-fa and then vocalise.

88. Abundant blackboard practice should be given in conjunction with the modulator work. An advantage of a written or printed exercise over a modulator exercise is that a pupil can see what is coming. The plans of interesting a class described in Sections 85 to 87 are of course equally available for blackboard exercises. It will be observed that the *written* note test, described in the requirements above, is only equivalent to the modulator test of the preceding Division, the leaps being confined to the doh chord. The tests given in Section 35 will therefore answer as specimens of written tests for this Division.

89. The tones *fe* and *ta*, the newest features of the note requirements, will be dealt with separately. The series of effects we call 'a key' has been shown to be the result of poising three similarly formed chords at certain distances or intervals from one another (see section 33). Thus the scale has been described as being derived from the tones of the Doh, Soh and Fah chords.



It has also been noticed (sec. 33) that iteration tends to make a Soh chord or a Fah chord sound like a new Doh chord (a chord of repose) because the ear forgets the former Doh chord. It will be easily seen then that if the Soh chord is so ready to be regarded as a Doh chord the use of the tone **fe** will help the impression. This is why the free use of **fe** (by leap to and from) practically changes the key, and as the sol-fa syllables in this connection are not attached to their accustomed mental effects, such a method of notation has to be employed with great discretion. All these facts are reproduced when **ta** is used. **ta** helps to make the Fah chord sound like a Doh chord because it provides what **te** could not, viz., a new **fah**. Leaps to and from **ta** therefore create difficulties for the reason given above. The code recognises the difficulties associated with **fe** and **ta** by expressly stipulating that only the easiest use of these tones will be tested. Thus, **fe** is to be always preceded and followed by **s** (**s fe s**) and **ta** is to be always preceded by **d**^{1} above and followed by **l** below.

(To be continued.)

Science Notes.

PROFESSOR TILDEN'S address to the Chemical Section of the British Association contains some remarks which will interest teachers, and possibly irritate them too. He thinks that at the present time 'England is as well provided with places of instruction for the study of chemistry as any country in the world, and that a very large proportion of the heads of the chemical schools have shown by their own activity in research that they are qualified to give instruction of the highest kind. But plenty of colleges, competent teachers, and abundance of pupils have not produced what could reasonably have been expected in the way of original research, or even of accurate analytical work.' Of course not. Well appointed laboratories and eminent professors are very well, but so long as students have to pass examinations they will, if they are wise, work for them. The responsibility rests not with them, but very largely with the eminent professors themselves. 'I could point,' says the Professor, 'to prominent schools where the chemistry and other branches of science are taught by a peripatetic South Kensington teacher who arrives weekly with his box of tricks.' This is rather hard on the South Kensington teacher and the peripatetic system. The peripatetic system is, of course, only a temporary expedient. Without it, in the case mentioned, as in many others, chemistry would not be taught at all, or what might be almost as bad, taught without the help derived from the box of tricks which the Professor makes merry with. In time every large school will have its own teacher and its own box of tricks. Has the Professor himself never made use of a box of tricks? And then why should it be thought an impossible thing for a competent teacher to hail from South Kensington? The Professor must settle that point with the Dean of the Science School. Most of the so-called science teaching sustained by the Science and Art Department is done by people of this kind, he tells us. Be it so. In our opinion the country might be worse served. It appears to us that to attack the institutions which are doing a great work is inopportune and ill-advised. It is scarcely worth while arguing the main charge. To compare a South Kensington science teacher to a man who has ten minutes' start with the book will be recognised as nonsense at first sight by everybody, even by the Professor himself. Surely it is no more necessary that a man should be an accomplished chemist in order that he may teach the elements of chemistry than that a man should be an eminent mathematician before he can adequately explain the principles of arithmetic or a first rate artist before he can give suitable instruction in geometry and perspective. It is true a man cannot teach what he does not know, but it is equally true that only a few can teach effectively what they do know. Knowledge is only one of the qualifications of a competent teacher.

Meantime it would be a good thing if the professors could themselves agree as to the best methods of teaching, or else agree to leave the matter open. Only give teachers more liberty to teach what they think best, and in the way they find most effective, and there would soon be a marked improvement in the science teaching of the country. It matters little where you go, it is pretty much the same, nearly all the earnest vigorous work is done with the distinct view of passing some examination. Till that is changed it is vain to look for any great improvement.

⁂

THE requirements for obtaining certificates to teach are raised somewhat. The possession of a degree no longer entitles its possessor to teach subjects not covered by his degree. Practically, the most important change is that relating to payment on two subjects only other than—(1) Practical Plane and Solid Geometry, and (5) Mathematics. Much can be said for the restriction to two science subjects. A lad with other subjects to learn cannot devote his attention profitably to more. One wonders that the step had not been taken before. But even now the restriction is only upon payment, not upon examination. A boy may still present himself for examination in a dozen science subjects, and be rewarded for it perhaps by obtaining a National Scholarship. Would it not be wise for the Department to go a little farther and make excellence in a few subjects, rather than mediocrity in many, the basis of distributing their rewards.

⁂

IT must never be forgotten that the nation owes much to the Science and Art Department, much more than many critics are prepared to admit. Years before the present awaking to our deficiencies and requirements it was up and doing. Its teachers had often to create the desire for what they had to supply. They worked hard and successfully, but unfortunately they could not do it for nothing. It cannot be said that the Department ever asked or expected them to do so. We trust that no dread of Lord Randolph Churchill will lead the Science and Art Department to pare down their payments to such a point as will cease to make it worth the while of teachers in every part of the country to teach such classes as they can get together with zeal and satisfaction.

⁂

THE New Directory for 1888—9 has been recently issued. As usual, the chief changes are printed in italic type. There are some important alterations and additions. A new elementary stage in general physics has been prepared, suggested, no doubt, by the new elementary chemistry. Some preliminary acquaintance with the barest elements of chemistry and physics are felt to be indispensable in studying other branches of knowledge. It is gratifying that this has been recognised, and to some extent provided for. In all probability the new subject will become popular, both with teachers and pupils.

⁂

Sir James Crichton-Browne contributed an article to the August number of the *National Review*, on Hand-craft. His paper is well worth an attentive perusal. We do not share his apprehension that the withdrawal of scholars for two or three hours a week for manual instruction from the obligatory school work, while the requirements of examiners remain the same, could only lead to increased over-pressure. He says that the attempt to provide such workshops in Manchester has proved a failure, but he omits to state that there are not a few other instances in which such experiments have not proved a failure but a very conspicuous success. Sir James gives excellent reasons for conclusions to which many others had already come, that drawing and modelling should henceforward occupy a prominent part in all school programmes. 'Time,' he says, 'must be found for the thorough and methodical teaching of drawing, which in infant schools should occupy one half the time, and in elementary schools hold a much more prominent and honoured place than it has heretofore done. Drawing and modelling, it appears to me, offer the true universal training of the hand, the best exercise for developing the hand centres in the brain, and the most suitable introduction to the handicrafts which the great bulk of our people must follow for a living.' The enormous importance of the early introduction of hand training is based upon the physiological fact that recent research has proved that the most active period of the development of the hand centres of the brain extends from the fourth to the fifteenth year. Children whose hands have been left untrained up to the fifteenth year are practically incapable of high manual efficiency ever afterwards.

Jeanne d'Arc, by Lamartine.

XX.

JEANNE D'ARC.	JOAN OF ARC.
Jeanne arriva à Chinon	Joan arrived at Chinon
dans ces circonstances.	under such circumstances.
On la logea dans le voisinage,	They lodged her in the neighbourhood,
au château du sire de Gaucourt.	in the castle of Gaucourt.
Visitée par les dames	Visited by the ladies
et par les seigneurs de la suite du roi,	and lords of the king's retinue,
sa simplicité ramena les uns,	Joan's simplicity (artlessness) dispelled the prejudices of some,
édifia les autres.	and strengthened the faith of others.
Les chevaliers qui tenaient	The knights who were
pour le roi dans Orléans	for the king in Orleans
avaient trop besoin d'un miracle	stood too much in need of a miracle
pour hésiter à croire à sa mission.	to hesitate to believe in her mission.
Ils envoyèrent quelques-uns des leurs	They sent some of their number
implorer et encourager leur future libératrice.	to call for and encourage their future deliverer (Saviour).
Le Dauphin, à leur instigation,	The Dauphin, at their instigation,
consentit enfin à la recevoir ;	at last consented to receive her ;
mais, dès le premier jour,	but, from the very first day,
il voulut l'éprouver.	he desired to prove (try, test) her.
L'humble paysanne de Domremy fut introduite,	The humble peasant of Domremy was introduced,
dans son costume de bergère,	in her shepherdess dress,
devant cette cour d'hommes d'armes,	before this court of men at arms,
de conseillers, de courtisans et de reines.	councillors, courtiers and queen.
Le Dauphin, vêtu	The Dauphin, clothed
avec une simplicité affectée	with affected simplicity,
et confondu dans les groupes	and mingling in the groups
de ses chevaliers richement armés,	of his knights richly armed
laissa à dessein la jeune fille	designedly left the young maiden
dans le doute sur celui d'entre tous	in doubt as to which of them
qui était son souverain.	was her sovereign.
'Si Dieu l'inspire véritablement,	'If God really inspires her,'
se dit-il,	said he to himself,
il la mènera à celui qui a seul	he will guide her to him who alone
dans ses veines le sang royal ;	has royal blood in his veins ;
si c'est le démon,	if the evil spirit inspires her,
il la mènera au plus apparent	he will guide her to the most likely one
d'entre mes hommes d'armes.'	among my knights.'
Jeanne s'avança en effet,	Joan in truth advanced,
confuse, éblouie, et comme indécise	confused, dazzled, and as if uncertain
entre cette foule,	among that crowd,
mais cherchant d'un regard timide,	but seeking with a timid look,
parmi tous, le seul vers lequel	among all, the only one to whom
elle était envoyée.	she was sent.
Elle le reconnut sans interroger personne ;	She recognised him without asking anyone ;
et se dirigeant modestement,	and going modestly,
mais sans hésitation, vers lui,	but without hesitation towards him (the Dauphin),
elle tomba à genoux	she fell on her knees
devant le jeune roi.	before the young king.
'Ce n'est pas moi qui suis le roi,	'It is not I who am the king,'
lui dit le prince, en cherchant	said the prince to her, while trying
à la jeter dans le doute.'	to make her doubt.
Mais Jeanne, que son cœur illuminait,	But Joan, whose heart inspired her with the truth,
insistant avec plus de force :	insisting with greater energy, said :
'Par mon Dieu, gentil prince,	'By Heaven, noble prince,
c'est vous, dit-elle, et non un autre !'	it is yourself and no other !'
Puis, d'une voix plus haute	Then, in a louder
et plus solennelle :	and more solemn voice :
'Très-noble Seigneur Dauphin !	'Most noble Dauphin !'
poursuivit Jeanne, le roi des cieux vous mande	continued Joan, 'the King of Heaven sends you word

par moi que vous serez sacré	by me that you will be consecrated
et couronné dans la ville de Reims,	and crowned in the town of Rheims,
et son lieutenant au royaume de France!'	and his lieutenant in the kingdom of France.'
A ce signe, la cour s'émerveilla	At this sign, the court marvelled
et le Dauphin s'émut	and the Dauphin was deeply moved
d'admiration pour la belle fille.	with admiration for the beautiful maiden.
Toutefois il voulut un autre signe	However, he desired another sign
plus difficile et plus secret;	(still) more difficult and secret;
et, l'entrainant à l'écart de sa cour	and, drawing her away from his courtiers
dans une embrasure de fenêtre,	into the recess of a window,
il s'entretint à voix basse avec elle	he conversed with her in a low voice
sur un mystère de son âme	about a secret of his soul
qui travaillait sa conscience	which troubled (tormented) his conscience,
et qui lui inspirait secrètement des doutes	and which secretly inspired him with doubts
sur son droit au trône.	as to his right to the throne.
Ce mystère n'avait jamais été révélé	This secret had never been revealed
par lui à personne.	by him to anyone.
La réponse inspirée de Jeanne,	The inspired reply of Joan,
bien qu'elle ne fût pas entendue	although it was not heard
des assistants,	by those present,
répandit visiblement la sécurité	spread before all eyes a sense of security
et la joie sur le visage du Dauphin.	and joy over the Dauphin's countenance.
Souvent, et récemment encore,	Often, and again recently,
il s'était renfermé dans son oratoire,	he had shut himself up in his oratory,
priant Dieu avec larmes que,	beseeching the Almighty with tears, that
s'il était en effet le légitime héritier	if he were truly the lawful heir
du royaume, la Providence voulût	to the kingdom, Providence would
le lui confirmer et défendre	assure it to him and defend
son héritage pour lui, ou du moins	his heritage, or at least
lui éviter la mort et lui assurer asile	save him from death and secure him a refuge
parmi les Espagnols ou les Ecossais,	among the Spanish or Scotch,
ses seuls amis.	his only friends.
'Je te dis de la part de Dieu,	'I tell thee from God,'
lui répète Jeanne à voix plus haute	Joan repeated to him with a louder voice
et en le saluant,	as she saluted him,
que tu es vrai fils de roi	'that thou art the true son of a king
et héritier de la France!'	and the heir of France!'

Grammatical Notes, Questions, Sentences, and Pieces for Translation to Jeanne d'Arc.

CHAPTER XX.

Croire quelque chose, is to consider it true: croire *à* quelque chose, is, to have faith, confidence, trust in it: croire aux sorciers, is, to believe that there are such beings as sorcerers; croire les sorciers, is, to believe what sorcerers say: croire en Dieu, is, to believe in the existence of God. Dès = from; des = some; dès que = as soon as. *Le très* humble (is the *absolute* superlative); *le plus* humble (is the superlative of comparison).

Oral Teaching: The Preparation of Lessons and of Notes of Lessons.

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The Art of Questioning.

Seeing that questions form so valuable a feature in all oral instruction, it becomes of the first importance that a teacher should acquire and develop the art of questioning. There are many first class speakers who think clearly, and who can deliver a continuous discourse with great eloquence and ease, who, nevertheless fail entirely when they attempt to question a class of children. The reason of this is found in the fact that they have not received the necessary training. This training involves the fulfilment of three main conditions, viz.:—

(1) The power to think logically and to state clearly; (2) Good models of the art of questioning for imitation, and (3) Practice in the actual effort of teaching.

Other things being equal, those with wide information make the best teachers; at the same time there are others whose stock of knowledge is limited, but whose skill in questioning and in communicating obtained by imitation of good models and much practice, is such that they teach with much success. It is further important that a teacher should begin to embody his thoughts in interrogative expression early in life before other modes of speech have become set and habitual.

The following rules should be observed in forming questions. It should, however, be remembered that no amount of study of rules can make up for lack of practice under skilful direction:—

1. The language of a question should be simple and familiar.—The ability to come down to the level of the scholar's knowledge and to embody our thoughts in the language of the child is of great value to the teacher. A pupil cannot be expected to answer readily and successfully if there is any doubt in his mind as to the meaning of the several terms of a question, or if his thought is expended to any considerable extent in grasping the meaning of the question as a whole.

2. The question should be definite and free from ambiguity.—It is almost as fatal to good questioning that the scholar be in doubt upon the point of a question as that he fail to understand its terms. As an example of questioning which results in leaving the mind in doubt the following may be quoted.

A teacher was recently giving a lesson upon 'the seasons.' Holding a rotating globe in his hand, he said, 'You see these two pegs, one at either end; well the globe turns round upon the piece of wire joining them. Now, what is that piece of wire called which runs through the earth from pole to pole? *Answers*:—1. The telegraph. 2. The Earth's axis. The fault in the teacher's question in this example consisted in his confusing in its terms two distinct things, viz., the illustration with the thing illustrated.

When questions which are wanting in clearness of statement are frequently set, they result in the formation of a habit of guessing on the part of the children. Instead of being trained to expect one correct reply only the scholars cast about for probable answers and supply any that may possess the slightest association with the question.

Whenever the teacher receives, in answer to his questions, erroneous replies one after the other until at last some pupil either able to supply the deficiency in the question or fortunate in making a guess, gives the correct answer, and the teacher pleased to be thus rescued from a difficult position says 'Yes, that is just the answer I wanted,' it will almost invariably be found that the teacher did not get the answer he wanted at first because he did not ask properly for it.

3. When a question has been put in simple language, do not immediately proceed to amend it by introducing an additional fact or idea, or attempt to replace it by a second question entirely different:—

Questioning of the following kind is sometimes heard:—A distinction is being pointed out between the stems of grasses and those of trees; the children are to notice the fact that trees have strong and solid trunks and branches, whilst grasses have hollow and for the most part slender stems. After showing the stems of various grasses, and a section of the trunk, or of a large branch of a tree, the teacher wishes the children to state in their own words the difference they observe. Instead of taking the grasses, and after examining the hollow structure of the stem and representing its structure by a diagram on the board, then dealing in the same way with the structure of a section of the trunk of a tree—exaggerating somewhat the peculiarities of each—thus continuing and deepening the sense of difference first gained by direct observation, and finally asking the simple and direct question, What difference do you observe between the cut end of the grass and that of the tree trunk?—instead of proceeding in this thorough and straightforward way, the following unskilful method of questioning is sometimes followed: 'You see the cut end of this grass stem and of this tree trunk; tell me what difference you notice between them? You saw me cut across the stem of grass, and I want you to compare it with that of the tree trunk. What is the grass stem like?

In this example there are two distinct questions. The first was quite correct, and if it had been allowed to remain, it would have been most likely correctly answered; the teacher, however, thought that the comparison it demanded was probably in advance of his class, hence he proceeded to simplify his question, and instead of requiring a comparison between two objects before the class he asks for the results of their observation of only one. Some of the children will answer the first question, some of them the second, and all will be more or less bewildered.

4. Questions should be logically arranged.—It has already been frequently urged in these pages that questions should be used chiefly for the educational effect which they are calculated to produce. In order that they may stimulate to intellectual effort of the best kind they should be arranged so that if the series of questions and answers were taken down they would exhibit a clear and consecutive narrative. In order to secure this sequence a thorough preparation of the lesson is essential. Now, whilst it is of the highest importance that the teacher should prepare the order in which the several portions of his lesson must be taken, and picture to his mind the probable course the children will follow at certain difficult and critical stages of the lesson, it should be remembered that nothing is more likely to render his lesson disconnected in thought and dead in delivery than the preparation of the actual questions to be set during the giving of the lesson. These must of necessity be controlled by the nature of the answers the children give; and as these cannot with certainty be anticipated neither can the consequent questions be determined. Furthermore, the teacher is occupied in the effort of memory necessary to recall the precise form of the next question instead of his thought being concentrated upon the answers of his class and the state of mind these answers reveal. The best preparation is that of a thorough mastery of the entire subject, and a complete view of the leading features of the lesson in the order of teaching; then, having acquired a facility in framing questions, it will be found that these will proceed in a well ordered sequence. A limited divergence from the prepared plan may be permitted in order to give any explanations which the children's answers may suggest, taking care, however, to bring back the class with as little violence to consecutive thought as possible to the next step in the lesson.

5. Questions should demand a reasonable effort on the part of the scholar:—It is as necessary that we avoid questions which can be answered with little or no thought, as that we carefully abstain from setting questions which no previous teaching justifies.

If for example a class of children have been told that London stands on the Thames; London is then compared in size with Liverpool, Hull, and Newcastle respectively; they are further told that the Thames carries more shipping on its waters than any other English port; that the river supplies most of the inhabitants of London with water, and that it carries away their refuse. With these facts before them the following questions may very fairly be set.

1. Which is the most important of the following rivers:—the Humber, Thames, or Mersey?
2. Why is the Thames so important?
3. Why is the Thames more important than the Tyne.

The **first question** requires an exercise of *judgment* in order to decide upon the claim of the Thames to pre-eminent position.

The **second question** serves to exercise the *memory* in recalling and recounting the entire series of claims upon which the importance of the Thames is based.

The **third question** demands a comparison between the series of claims just enumerated, and those which a much smaller town and port would (*by inference*) invest the Tyne.

Whilst the questions stated above are thus seen to arise fairly out of the matter previously communicated, and at the same time to awaken and exercise simple and useful intellectual effort, the following questions are faulty.

1. Place the rivers mentioned in the order of their importance.
2. So we see that the Thames is the most important river. Is it not?

The **first question** requires a further statement of facts.

The **second question** can be answered without awakening any effort on the part of the class.

Answers to Questions.—Nothing manifests the tact and resource of a teacher more fully than the readiness and skill with which he deals with the answers to his questions. What is the meaning of the word 'grazing' in the sentence 'the horses were grazing in the field'? asked a teacher. 'Eating' answered a boy less anxious to be correct than to be first in reply. 'No,' said the teacher, passing to another child for a more correct answer. It was afterwards suggested to the teacher that the first boy's answer should have been utilised and not negatived. 'Yes, the horses were eating as. you say; but suppose you saw the same horses feeding out of their nose-bags in the street, you could not say then that they were "grazing." Think a moment; you have just read about these horses grazing in a field. What would be their food? *Grass.* Now tell me what grazing means.

Children very rarely answer entirely without thought and, whilst we check the habit of guessing and all hasty and ill considered speech, we must take care not to discourage all effort on the part of our scholars by receiving as entirely wrong that which is in part correct.

The importance of insisting upon full answers to questions has already been urged. All broken and fragmentary utterances on the part of children must be discouraged, so that their answers may be of assistance to them in their efforts after careful thought and accurate expression.

To this intellectual result there may be added a disciplinary effect if only we receive our replies from as wide a class area as possible; for whilst answers are accepted from the brighter members of a class, who are thus encouraged to maintain their leading position, it is very necessary that the slower members should be stimulated to effort by frequent appeal. In this way the full advantage which emulation, working through the entire class, yields, may be secured.

(*To be continued.*)

How a Scotch School was Examined.

Infants.—Reading.—There were three classes who read from Blackie's 'Comprehensive Primers,' I. and II., and from Nelson's 'New Royal Reader,' 2nd Series. In first class all read, in lower classes each read till the Inspector said 'Next.'

Writing.—While one class read the others wrote the capitals *K*, *G*, *D*, *Y*, and small letters up to *k*.

Arithmetic.—All were arranged in gallery, and something like the following tests were given:—9 and 5? 7 and 8? 14 and 6? 10 and 7? 8 and 4? 9 and 7? 14 and 7? 11 and 8? 7 away from 9? 6 less than 15? 4 from 12? 5 from 7? 3 from 20? &c. A sheep has four legs, a hen two; how many legs altogether? How many legs have two cows and one calf?

Object Lesson.—Pupil teacher gave a lesson on the 'Ostrich.' Inspector did not interfere. Mistress gave a lesson on 'Colour.' A list of lessons on Animals, Manufactures, and Mining was submitted.

Music.—Scale of C. **d r d m d f d s d l d t d d'**. One action song was sung.

Schedule called the first day of examination and the infants were heard the second day.

Standard I.

Reading.—('New Royal Reader,' I., and 'Comprehensive Reader,' I.). All the pupils read—half from one book and half from the other, the slower ones being asked for two paragraphs.

Writing was taken from 'Comprehensive Reader,' and the pupils being numbered 1, 2, 3 all round, wrote a line corresponding to their numbers. Spelling was asked, and the meaning of simple phrases or of words.

Arithmetic.—This as usual given in words, the pupils being arranged so as to prevent copying:—

1. 402 + 900 + 390 + 401 + 60. 2,153. Ans.
2. 948 + 785 + 989 + 786 + 845. 4,353. Ans.
3. 409 − 125. 284. Ans.

Music.—The teacher pointed a few intervals as **d f l s m r s t d'**, and then the children sang 'Pretty little Sunbeam.'

Standard II.

Reading.—(Blackie's 'Comprehensive Reader,' II., and 'New Royal Reader,' II.) All read, half a dozen from each book alternately round the class, a sentence, a paragraph, or more according to fluency.

Dictation.—Three lines were taken from the book used all the year, and were read in single words by the pupil teacher who had charge of the class. The slates were examined and then grouped into those having no errors, one error, two errors, &c. The results were noted by the Inspector.

The meaning of words and phrases asked, and the nouns were pointed out by some of the smarter fellows.

The copy-books were not looked at, but the penmanship on slates was minutely examined.

Music was taken along with the higher standards.

Arithmetic.—Read in words—pupils stood back-to-back.

1. 9,089 + 7,509, 8,700, 7,098, 9,860, 7,009. 49,265. Ans.
2. 5,093,614 − 2,976,958 (*figures*). 2,116,656. Ans.
3. 46,913,857 × 4 (*figures*). 187,655,428. Ans.

Standard III.

Reading.—('Comprehensive Reader,' III., and Collins's 'Geographical and Historical Reader,' III.), The reading was taken from the first, the class standing seat by seat, and one paragraph taken from each.

The meaning of single words rather than phrases was asked.

Analysis.—The subject, predicate, and object were required to be selected from simple sentences chosen from the reading lesson, and the noun, verb and adjective asked to be pointed out by a pupil taken at random.

Dictation consisted of an easy five lines from 'Comprehensive Reader.'

Arithmetic.—Given from Cards, of which the following is a specimen:—

1. Divide seven hundred and thirty-one thousand six hundred and forty by six hundred and forty-nine. $1{,}127\frac{217}{649}$. Ans.
2. Multiply ninety-five thousand and eight by eight thousand and ninety-four. 768,994,752. Ans.

3. Divide 218,421,616 by two hundred and seventy-three. 800,079$\frac{49}{273}$. Ans.

4. Find the sum of £31 0s. 7½d.; £49 16s. 5d.; 13s. 0½d.; £14 15s. 0½d.; and 19s. 2d.
£97 4s. 3½d. Ans.

Geography taken along with Standard IV., so far as concerns 'Scotland.' Questions were given on the islands on the west. What separates Islay from Jura? Jura from Cantyre? Cantyre from Arran? Mountains in Perth? Rivers in Inverness? Towns in Berwick? Capes in Ayrshire? Where is Ben More? Ben Nevis?

Standard IV. was then questioned on Ireland.

Recitation.—Each one repeated a verse of 'Lord Ullin's Daughter' and 'The Inchcape Bell.' The meanings of the principal words were asked.

Standard IV.

Reading.—('New Royal Reader,' No. IV., and 'Royal Scottish Reader,' No. IV.) The whole class read either a paragraph of prose or a verse of poetry from the 'Royal Reader.' The meaning of words and phrases from reading lessons.

Grammar and Analysis of simple sentences from any part of reading lesson; the word to be parsed being chosen by the examiner. About ten or eleven sentences in all were given to be analysed, and three or four of these sentences were parsed.

Geography.—See under Standard III.

History.—Charles I. and James II., genealogy and dates; battles of Civil War; causes of the war; military leaders; and then a few general questions.

Recitation.—'Wreck of the Hesperus,' a verse round the class, and then the meanings of words and phrases.

Music taken with V. and VI.

Arithmetic.—Four different Cards, of which the following is a sample:—

1. From £1,000 take £5 8s. 4d., and divide the result by 8. £124 6s. 5½d. Ans.

2. Multiply £643 12s. 5½d. by one hundred and thirty-seven. £88,176 3s. 11½d. Ans.

3. How many drams are in 3½ cwts.?
100,352 drams. Ans.

4. How much will a profit of £30,251 15s. 5d. gain to each of 25 shareholders?
£1,210 1s. 5d. Ans.

Standard V.

Reading.—('New Royal Reader' and 'Royal Scottish Reader,' No. V.) The reading was taken from the first, and the lesson chosen was 'Topsy,' from which the intelligence was tested.

Composition.—The story of Napoleon and the British sailor was told in the Inspector's own words, and the pupils required to reproduce it in the usual way.

Grammar and Analysis.—Sentences containing a principal clause and a subordinate one were selected from the reading lesson to be analysed, and the parsing of relative pronouns was a special feature of this part of the examination.

Arithmetic.—Three or four different Cards were distributed, of which the following is an average specimen:—

1. If 9 acres 3 roods 32 poles feed a flock of 25 sheep, how much will it take to feed a flock of 480 sheep? 191 ac. 0 ro. 6⅖ po. Ans.

2. Calculate by practice the value of 6,245 articles at £3 14s. 9d. each. £23,340 13s. 9d. Ans.

3. If 250 herrings go to a cran, and it takes 15 crans to fill a boat, what will be the cost of a boat load at 1½d. for 2? £11 14s. 4½d. Ans.

4. Simplify $(\frac{1}{2} - \frac{1}{3}) \div \frac{1}{3}$ of $\frac{1}{11}$. 5½. Ans.

History.—American War of Independence; the '45; Questions on the effect of the Bill of Rights; the Act of Settlement, and the French Revolution.

Geography.—Rivers of Europe, source and mouth; Lakes of Italy; River of British Columbia; physical features of British America; towns (notes on them) of Australia.

Map-drawing was not professed, but the Inspector recommended special attention to this before his next visit.

Recitation.—'Horatius' (Macaulay), from which a few lines were repeated by each, and then meanings and allusions carefully gone over.

Standard VI.

Reading.—('New Royal' and 'Scottish Readers,' No. VI.) 'Trysting-tree' from Ivanhoe. Analysis and parsing from the same. Intelligence from reading-lesson, and this was pretty stiff for both Standard V. and VI.

Arithmetic.—A. (1) When corn was £2 per bushel, the 4 lb. loaf cost 6d. How much ought the 3 lb. loaf to cost when corn has fallen to 32s?
3⅗d. Ans.

2. Simplify $\frac{3\frac{1}{2} - 1\frac{7}{8}}{3\frac{1}{4} \times 2\frac{1}{2}} - \frac{1}{5}$ of $2\frac{3}{4}$. $-\frac{7}{20}$. Ans.

3. Express $1\cdot\dot{6}$ of 4s. 2d. as the decimal of 18s. 6d.
$\cdot\dot{3}7\dot{5}$. Ans.

4. Find the simple interest on £561 10s. for 73 days at 2¾ per cent.? £3 1s. 9$\frac{9}{50}$d. Ans.

B. (1) Express in pints 3·645 pecks — ·09 qts. + ·0018 bushel. 58$\frac{319}{1250}$ pints. Ans.

2. In how many years will £1,000 become £1,213 6s. 8d. at 5½ per cent.? 3$\frac{29}{33}$. Ans.

3. If three men enter into partnership with a capital of £1,250, the first getting $\frac{3}{10}$ of the whole, and the second ⅕ of it, how much does the third enter with?
£625. Ans.

4. If 4 tons be carried 128 miles for £2 8s., how far ought 40 cwts. to be carried for 6s?
832 miles. Ans.

Geography.—Physical features of India; the rivers of United States; the countries of S. America; description of any one.

History.—The Corn Laws; the Chartists; the Crimean War; the various Afghan wars; and the Abyssinian War.

Recitation.—'The Saxon and the Gael,' a few lines from each, and the meanings of words and phrased.

Music.—Modulator, scale of C with removes to right and left, all the usual intervals with **d' ta l s fe s.** The following was handed to the teacher by the Inspector as a modulator exercise: doh me soh te doh' me ray te, doh soh ray me lah soh fe soh lah ray doh.

Stacatto. V V V
Sight-singing Test.—Key E. | m : m | m : m.s }
| s.f : f.m | f :— | r : r | r : m.l | l.s : s.fe }
V V V
| s :— | m : m | m : m.s | s.f : f.m | f :— }
V V V
| r : r | r : m.r | r.d : d.t, | d :— ||

Questions were asked on time, as to what constituted two-pulse, three-pulse, &c., and the different accents, as strong, medium, and weak. What were the signs for these?

Registers were tested as usual by taking names from the Schedules.

The sewing was carefully examined, and from the Infants to the Sixth Standard Schedule 3 was taken as a guide to test practical work.

* * *

My Drawing Examination and How it was Conducted.

BY A
HEAD TEACHER.

STANDARD I.

The following were the Inspector's instructions:—

1. Divide slates into two equal parts.
2. Place a dot in the middle of that line.
3. Make another dot one quarter of an inch above that dot.
4. Through that dot draw a line three inches long, and parallel to the middle line.
5. Upon the line construct a square, using rulers and set-squares.

Each step was done by the teacher on the blackboard, and then by the scholars on their slates.

The Inspector left the class and returned in 12 minutes.

He then told the children to draw the same figure freehand, exactly under the top one, and the same size, the top line being as far below the middle line as the base of the top one was above it. The same time was allowed for this exercise.

Afterwards the teacher was requested to ask questions on the square and different angles.

The slates were then collected, and examined individually by the Inspector.

STANDARD II.

The exercise was the same as Standard I., but on paper.

The children were directed to divide the sides of the papers on which their names, &c., were not written into two equal parts, by measuring 5½ inches on each side from the top, placing dots, and ruling lines across the papers.

The centre of the line had then to be found, and marked by a dot. Another point had then to be placed half an inch above it. This formed the centre of the base line of a square of 4 inches side. The square had then to be constructed with rulers and set-squares, the children following the teacher's example on the blackboard, line by line.

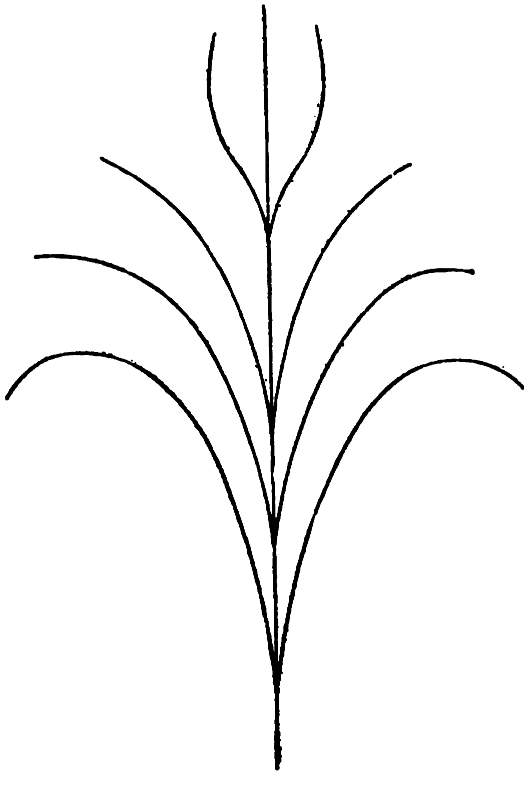
The second square had to be drawn freehand, the same size, and half an inch below the line.

The teacher was allowed to go round the class, and point out errors in the first square, but not in the second.

The Inspector afterwards questioned the class on the different angles, and called boys out to draw acute, obtuse, and right angles on the blackboard.

STANDARD III.

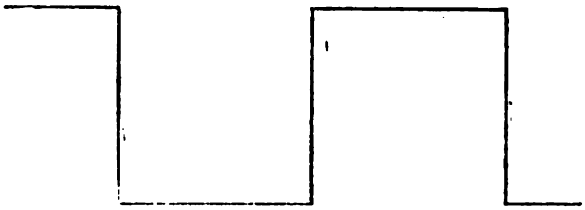
Half the class had the following freehand copy (which was pinned on the blackboard) to draw on the clear sides of their papers, marking off an inch from the top and bottom by dots, and then drawing straight lines joining them with rulers:—

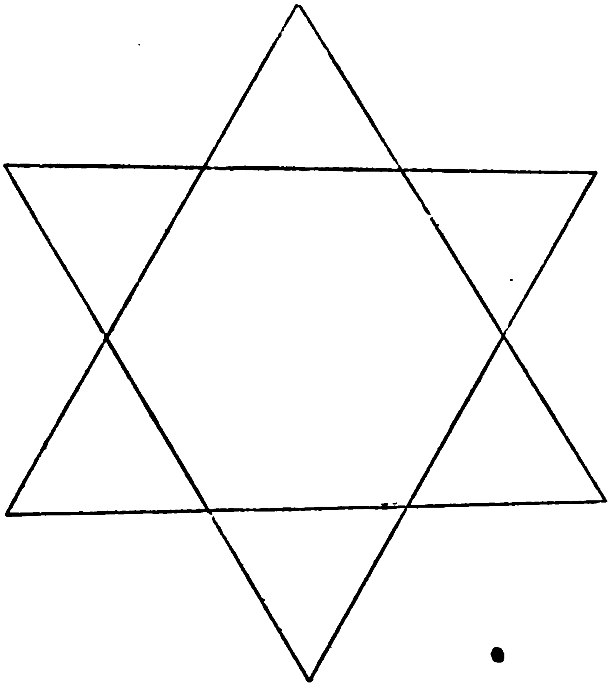


The other half had cards, and these were of two kinds, each containing two figures, the first to be drawn freehand, and the second with rulers and set-squares. The full size of the papers was taken, and they had to be divided into two equal parts, the freehand copy being drawn in the upper half, and the ruled copy in the lower half, and each copy had to be drawn half as big again as the printed copy.

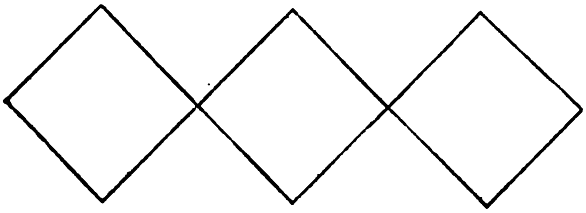
The following were the figures:—

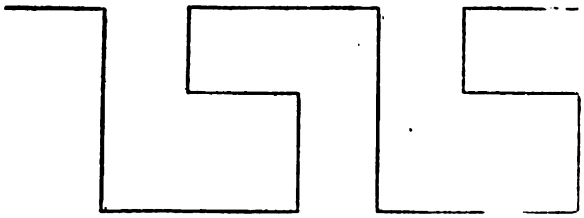
(First Card.)





(*Second Card.*)

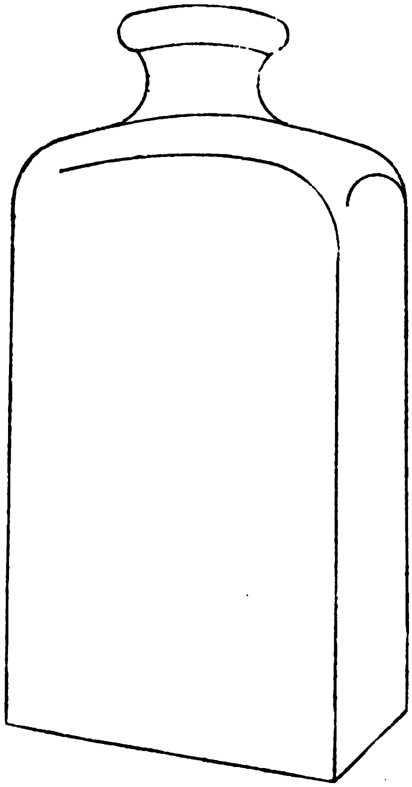




Note.—The first copy on each card was the freehand copy.

STANDARD IV.

Freehand.—The following freehand copy was pinned on the blackboard, and had to be drawn by a third of the class on the clear side of the paper, a line being drawn with ruler in the middle of the paper within an inch of the top and bottom, and serving as the centre line of the figure:—



Scale Drawing.—Another third of the class took this subject, and cards were distributed containing two questions, the cards being marked alternately *on squared paper* and *on plain paper.*

The following were the problems:—

1. Draw the money box on squared paper. Each square stands for ¼ in.

2. Make a scale of 3 ft. 6 in., scale ½ in. to 1 ft.

1. Draw a scale of ½ in. to 1 ft.

2. This is the front view of a looking-glass. Copy it twice the size.

1. Draw the front view of a swing. Each square stands for 2 in.

2. Draw the side view of the shovel. Each square stands for ½ in.

1. Draw a scale showing 2 ft. 2 in., scale 1½ in. to 1 ft.

2. Draw the side view of the cottage three times the size.

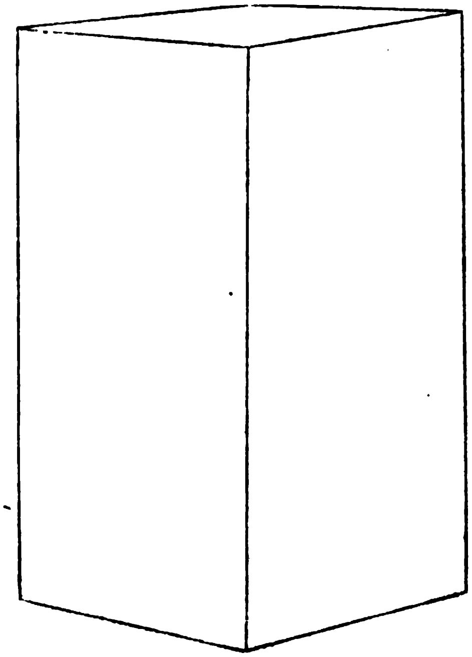
1. The drawing shows a side view of a sentry box. Each square stands for 2 in.

2. The drawing shows the view of a large screw. Each square stands for ¼ in.

Note.—Several boys had the same questions.

Model.—The remainder took model drawing. A square prism was placed on one of its smaller ends in the centre of a blackboard on two chairs, and which was consequently considerably below the level of the eye. The model only had to be drawn.

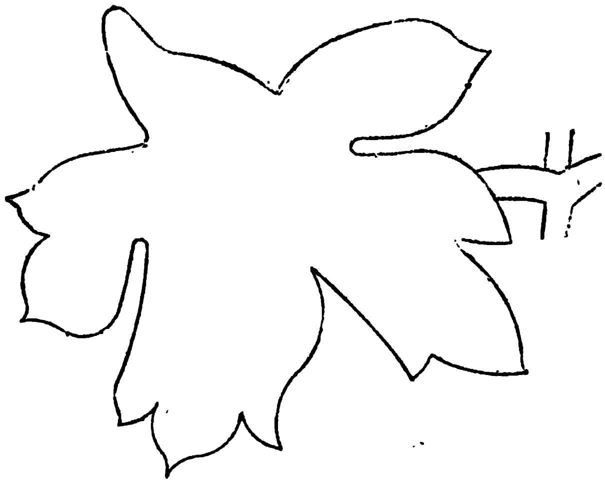
The following shows the view of the model from the position directly in front of it:—



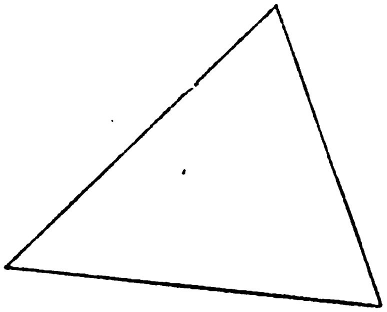
STANDARD V.

This Standard was also divided into three parts for the three subjects.

Freehand.—The following freehand copy was pinned on the blackboard, the Inspector telling the children to draw lines with rulers across and down the middle of the paper to ensure a large copy:—



Geometry.—The following were the geometrical problems, each card containing three questions, and several boys had the same problems:—



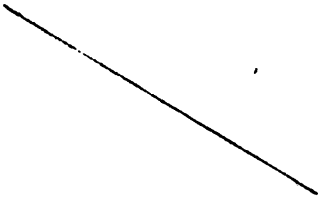
1. Copy the given triangle, and bisect one of its sides and one of its angles.

2. Draw two right lines each 2 feet long, which shall meet at an angle of 90°. This problem has to be worked to the scale of 1¼ inches to 1 foot.

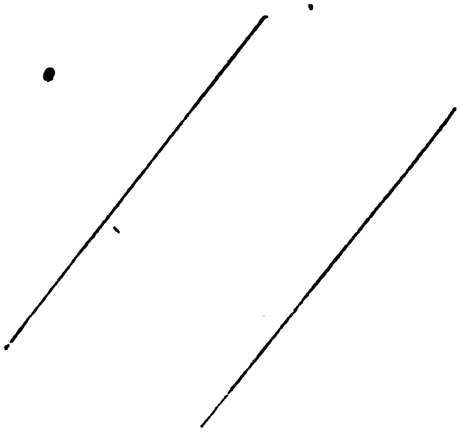
3. Construct a triangle having a base of 2½ inches, and angles of 45°, 45°, and 90°.

1. Construct a triangle having angles of 60°, 45°, and 75°, and base 2 inches.

2. Construct a 2 ft. square to the scale of ¾ inch to 1 foot.

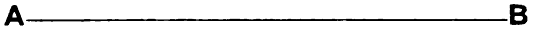


3. Copy the given line and point A. From A draw a line perpendicular to the given line.



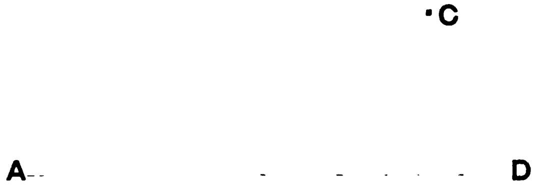
1. Copy these two parallel lines, and draw a line parallel to them, midway between them.

2. Copy the line AB and mark the point C. At C draw a line 1½ inches long perpendicular to AB.



3. Make the line AB the base of a triangle with angles of 30°, 60°, and 90°.

1. Make an angle of 60°, and bisect it.

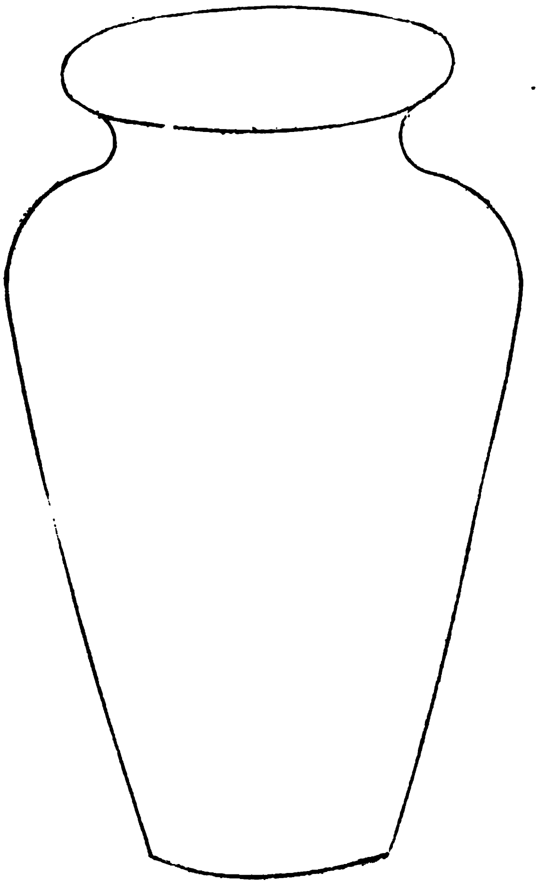


2. Draw a line parallel to AD through the point C.

3. Draw an isosceles triangle with base 2 inches, and the angle opposite the base 45°.

Model.—The model was a vase standing on a black-board placed on two chairs, and it was considerably below the level of the eye. The vase only had to be drawn, a space of 2 inches being left at the top and bottom of the paper.

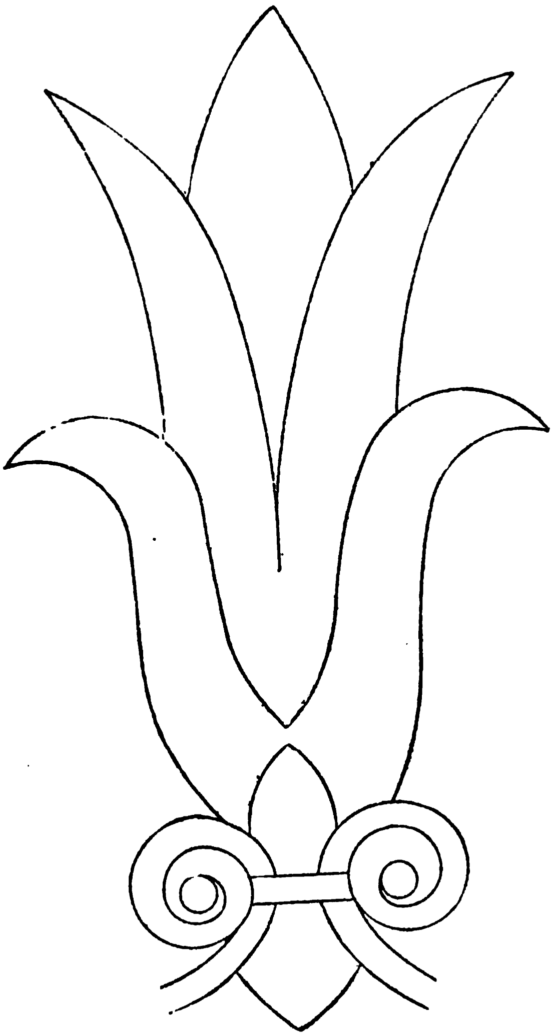
The following shows one of the views of it:—



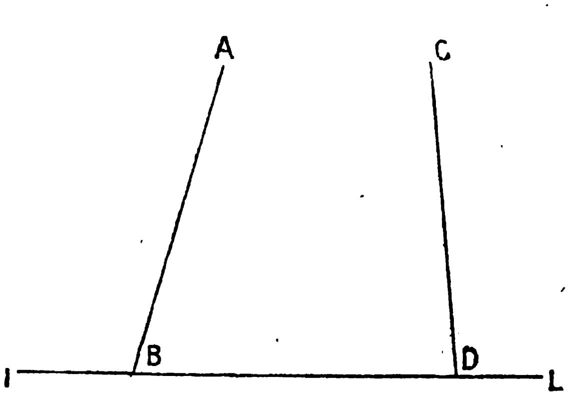
STANDARDS VI. AND VII.

Both Standards took the work of Standard VI., and as all tried for the card of merit, every boy took the three subjects.

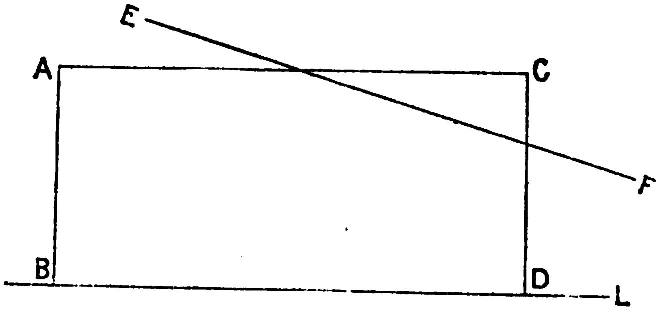
Freehand.—The following was the freehand copy, which was pinned on the blackboard, a space of one inch having to be left on the papers at the top, bottom, and sides, and a line drawn down the middle with rulers:—



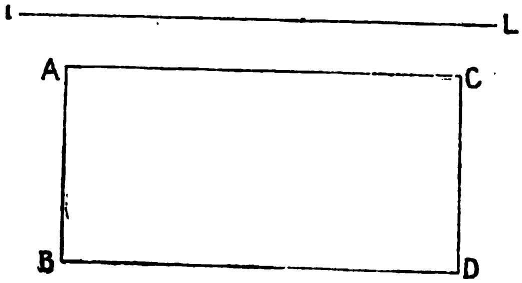
Solid Geometry.—Each card contained two problems, and several boys had the same questions.



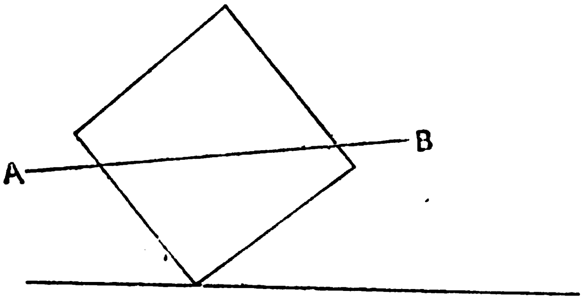
1. AB and CD are the elevations of two right lines, both parallel to the vertical plane. Copy the elevations, and draw plans.



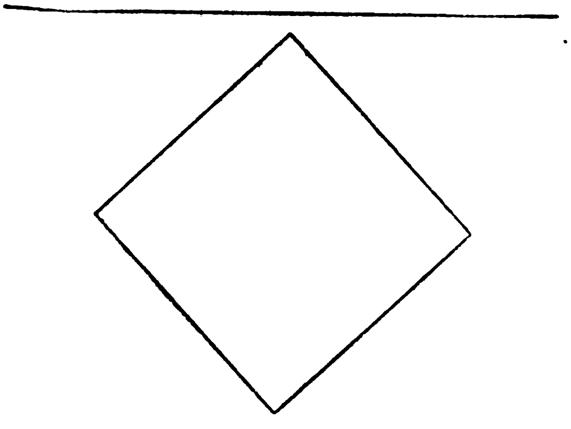
2. This is the elevation of a right prism, the bases AB and CD being squares. Copy the elevation, and draw the plan, and on it draw the plan of the section made by EF.



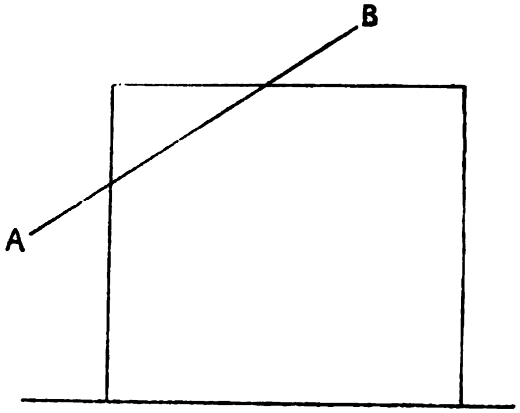
1. This is the plan of a right prism, AB and CD being squares. Copy the plan, and draw the elevation.



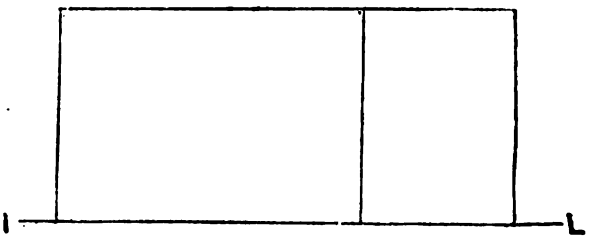
2. This is the elevation of a cube. Copy the elevation, and draw the plan, supposing the portion above AB to be taken away.



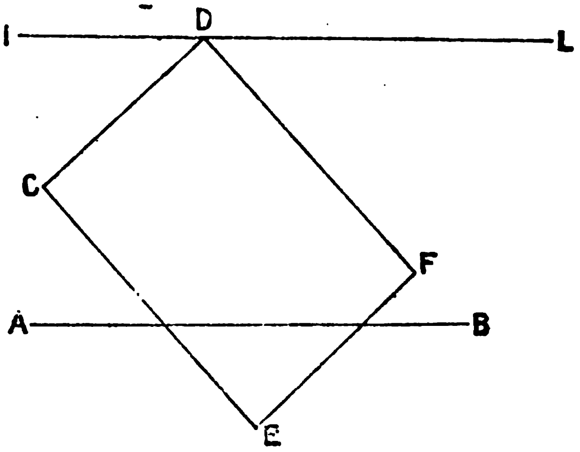
1. This is the plan of a cube. Copy the plan, and draw the elevation.



2. This is the elevation of a right prism, the bases being squares. The prism stands upon its base. Copy the elevation, and draw the plan, also the plan of the section made by AB.



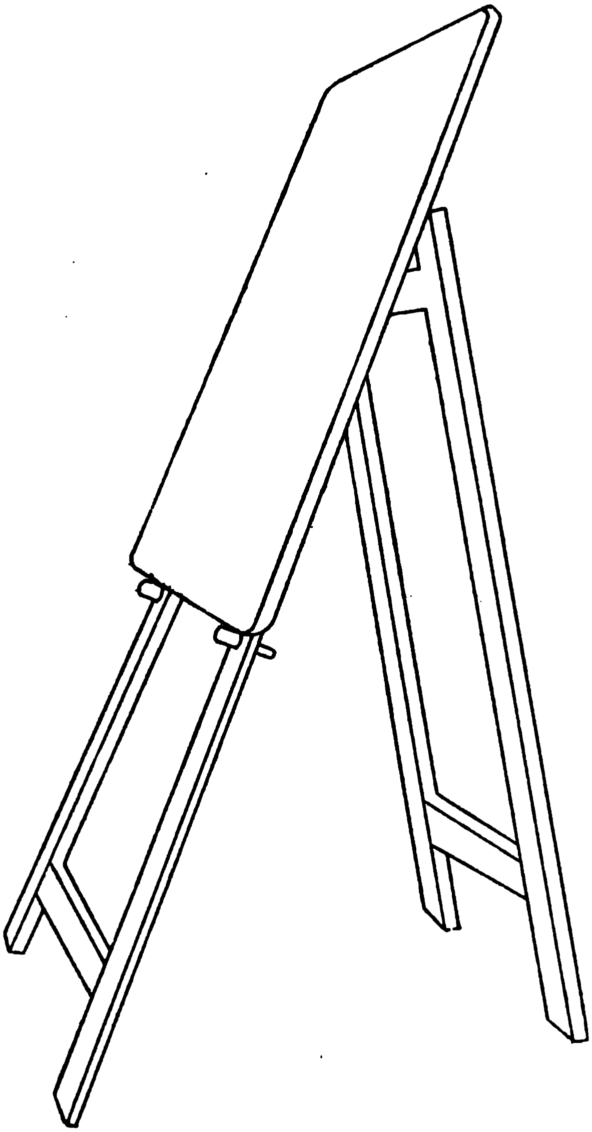
1. This is the elevation of a cube. Copy the elevation, and draw the plan.



2. This is the plan of a right prism, and CD and EF are squares. The diagonal in each square is parallel to the horizontal plane. Copy the plan, and draw its elevation, and also the elevation of the section made by AB.

Model.—The model was an easel and blackboard, placed at a very difficult angle.

The following shows one of the views of it:—



Second Grade.

Freehand.—There were two copies, viz., an ornamental vase and symmetrical ornamental work.

Model.—The models were a hexagon and a vase, not touching, placed on a blackboard which was on two chairs. The models were not in the centre, and the blackboard had to be drawn. The models were considerably below the level of the eye.

* * *

Publications Received.

Bell, G., and Sons—

English Passages for translation into French. By A. C. Clapin, M.A.
Examination Papers in Book-keeping. By J. T. Medhurst.

Blackie and Son—

Algebraic Factors. By Dr. W. T. Knight.
Shakespeare's Macbeth, with Notes.

Cassell and Co.—

The New Latin Primer. By Dr. Postgate.

Curwen, J., and Sons—

Operetta: The Voices of Nature. By N. B. Sargent.
Operetta: Too Bad; or, Discontented Judith. By A. J. Foxwell.
Action Songs for School Concerts. By A. L. Cowley.

Dawson, A. G.—

Standard Teaching Helps. By H. Major, B.A., B.Sc.
English Composition, and How to Teach it. By R. S. Wood.

Fisher Unwin, T.—

The Story of the Nations—Holland. By Prof. Thorold Rogers.

Hodder and Stoughton—

Sure to Succeed. By Dr. Thain Davidson.

Houlston and Sons—

The 'Beautiful Valley' Series of Sermons to Children, Nos. 5 and 6. By the Rev. John Bruster.

Industrial Education Association—

Aspects of Education. By Oscar Browning, M.A.
Mark Hopkins. By Leverett Wilson Spring, D.D.

Johnston, W. and A. K.—

Diagrams on Colour. Sheets No. 1 and No. 2, with Handbooks. By John Howard, F.C.S.

Macmillan and Co.—

A Text-Book of Euclid's Elements. By H. S. Hall, M.A., and F. H. Stevens, M.A.

Murby, Thomas—

Cantata: Elsa and the Imprisoned Fairy. By J. Gwynne Bettany and Thomas Murby.

Nelson, T., and Sons—

Royal Star Arithmetic. Standards 1 to 7 complete.

Oxford University Press—

Livy, Book XXII. By M. T. Tatham, M.A.
The Traveller (Goldsmith). By G. Birkbeck Hill, D.C.L.

Pitman and Sons—

Thankful Blossom. By Bret Harte (Phonography).
Gleanings from Popular Authors (Phonography).

Smith, Elder and Co.—

The Cornhill Magazine. September and October.
Suggestive Lessons in Practical Life. 1st Series.

Swan Sonnenschein and Co.—

A School Arithmetic. By G. H. Bateson Wright, M.A.
The Cyclopædia of Education. Part 8.
The N. G. A. Latin Primer. By G. Stewart Levack.

The Clarendon Press—

A Latin Prose Primer. By John Young Sargent, M.A.
An Introduction to Latin Syntax. By W. S. Gibson, M.A.

Query Column.

RULES.

1. Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

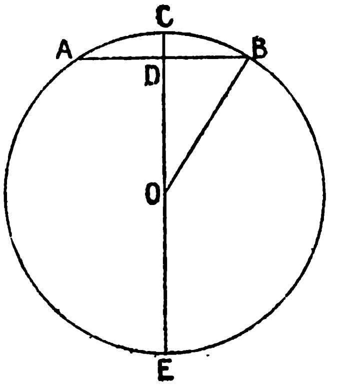
5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

⁂ All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.*

Mensuration.

1. G. O. M.—The tip of a bud of lotus was seen a span above the water; forced by the wind it gradually advanced, and was submerged at a distance of two cubits. Compute the depth of the water. (*Barnard Smith.*)



Let AB represent the surface of the water, and OC the lotus; then at B the lotus is submerged, and DO represents the depth of the water.

CD represents a span = 9 in.; DB represents 2 cubits = 36 in.

First Method.

$$\begin{aligned} AD &= DB = 36 \text{ in.} \\ CD \times DE &= AD \times DB \quad \text{(III. 35.)} \\ 9 \text{ in.} \times DE &= 36 \text{ in.} \times 36 \text{ in.} \\ \therefore DE &= 144 \text{ in.} \\ CE &= CD + DE \\ &= 9 \text{ in.} + 144 \text{ in.} \\ &= 153 \text{ in.}; \\ OC &= \tfrac{1}{2} CE \\ &= 76\tfrac{1}{2} \text{ in.}; \\ \therefore \text{Depth of water (DO)} &= 76\tfrac{1}{2} \text{ in.} - 9 \text{ in.} \\ &= 67\tfrac{1}{2} \text{ in.} \\ &= \underline{5 \text{ ft. } 7\tfrac{1}{2} \text{ in.}} \quad \text{Ans.} \end{aligned}$$

Second Method.

$$\begin{aligned} OB^2 &= OD^2 + DB^2 \quad \text{(I. 47.)} \\ &= (OC - CD)^2 + DB^2 \\ &= (OB - 9)^2 + 36^2 \\ &= OB^2 - 18\,OB + 81 + 1296 \\ 18\,OB &= 1377 \\ \therefore OB &= 76\tfrac{1}{2}. \\ \therefore OD \text{ (Depth of water)} &= OB - CD \\ &= (76\tfrac{1}{2} - 9) \text{ in.} \\ &= \underline{5 \text{ ft. } 7\tfrac{1}{2} \text{ in.}} \quad \text{Ans.} \end{aligned}$$

Arithmetic.

1. Skipton.—A tradesman proposed to retail his goods at 10 per cent. profit, but adulterates them by adding $\frac{1}{4}$ of their weight of an inferior article, which costs him $\frac{4}{5}$ths of the price of the better; what profit per cent. does he make, also in what proportion must he mix the two kinds so as to gain 20 per cent.? (*Lock's* 'Arithmetic for Schools.')

Prime cost of goods which are sold for £110

$$\begin{aligned} &= £75 + \tfrac{4}{5} \text{ of } £25 \\ &= £75 + £20 \\ &= £95; \end{aligned}$$

Profit = £110 − £95 = £15;

$$\therefore \overset{£}{\underset{19}{\cancel{95}}} : \overset{£}{100} :: \overset{£}{\underset{3}{\cancel{15}}} : \text{Gain per cent.}$$

)300(15
19
110
95
15

$$= \underline{15\tfrac{15}{19}} \text{ per cent.} \quad \text{Ans.}$$

$$\overset{£}{\underset{3}{\cancel{120}}} : \overset{£}{11\cancel{0}} :: \overset{£}{\underset{25}{\cancel{100}}} : \text{Prime cost of the}$$

goods sold for the same money as preceding case to gain 20°/。

$$\begin{aligned} &= \tfrac{275}{3}£ \\ &= £91\tfrac{2}{3}. \end{aligned}$$

$$\begin{aligned} \text{Gain on inferior goods} &= £100 - £91\tfrac{2}{3} \\ &= £8\tfrac{1}{3}; \\ \therefore \text{Nominal value of inferior goods} &= £8\tfrac{1}{3} \times 5 \\ &= £41\tfrac{2}{3}; \\ \text{Value of better goods} &= £100 - £41\tfrac{2}{3} \\ &= £58\tfrac{1}{3}; \\ \therefore \text{Better goods} : \text{Inferior goods} &:: £58\tfrac{1}{3} : £41\tfrac{2}{3} \\ &:: 175 : 125 \\ &:: 7 : 5. \quad \text{Ans.} \end{aligned}$$

2. Sibncyn Pantmoch.—I leave home at 8 o'clock to catch a train. If I walk at the rate of 4 miles an hour, I shall be 10 minutes too late, and if I walk at the rate of 5 miles an hour I shall be 5 minutes too soon. How far is the station from my house, and when does the train start? (*Pupil Teachers' Examination*, October, 1887.)

$$\begin{aligned} \text{Difference in time between the rates} &= (10 + 5) \text{ min.} \\ &= 15 \text{ min.}; \\ \text{Difference in time for 1 mile} &= (\tfrac{60}{4} - \tfrac{60}{5}) \text{ min.} \\ &= (15 - 12) \text{ min.} \\ &= 3 \text{ min.}; \\ \therefore \text{Distance from station} &= \tfrac{15}{3} \text{ miles} \\ &= 5 \text{ miles}; \end{aligned}$$

Time of arriving at station walking 5 miles an hour = 9 o'clock,

∴ Time of train starting = 5 min. past 9.

Trigonometry.

1. RUSTICUS.—In the *ambiguous case*, when a, b and A are given, show that the circles circumscribing both triangles are equal in magnitude, and that the distance between their centres is

$$\sqrt{a^2 \operatorname{cosec}^2 A - b^2}.$$

(*Todhunter's* 'Trigonometry for Beginners.')

$$R \text{ (radius)} = \frac{a}{2 \sin A}. \quad \text{(Page 118.)}$$

Now the two triangles denoted by ABC in Case I. of Art. 88 have the same values of a and A;

∴ R has the same value in the two triangles.

Suppose a straight line drawn from the middle point of CA at right angles to CA; then the centre of each circle is on this straight line.

The triangle for which the angle at B is acute has the centre of the circle on the same side of CA as B; the triangle for which the angle at B is obtuse has the centre of the circle on the opposite side of CA.

The distance of each centre from CA is numerically equal to R cos B.

Hence the distance between the centres = 2R cos B

$$\begin{aligned} &= 2R\sqrt{1 - \sin^2 B} \\ &= \sqrt{4R^2 - 4R^2 \sin^2 B} \\ &= \sqrt{\frac{a^2}{\sin^2 A} - \frac{a^2 \sin^2 B}{\sin^2 A}} \\ &= \sqrt{a^2 \operatorname{cosec}^2 A - b^2}. \end{aligned}$$

Algebra.

1. HEATHER.—If the mth term of an A. P. be n, and the nth term be m, of how many terms will the sum be $\frac{1}{2}(m + n)(m + n - 1)$, and what will be the last of them? (*Todhunter.*)

If a = first term, and d = difference,

$$\text{Then, } \left.\begin{aligned} (1)\ n &= a + (m - 1)\, d \\ (2)\ m &= a + (n - 1)\, d \end{aligned}\right\}$$

$$\begin{aligned} \text{Subtracting]}\ n - m &= (m - n)\, d \\ (m - n)\, d &= -(m - n) \\ \therefore d &= -1. \\ (1)\ n &= a + (m - 1)\, d \\ &= a + [(m - 1) \times -1] \\ &= a - m + 1 \\ \therefore a &= m + n - 1. \end{aligned}$$

Let x = No. of terms;

$$\text{Then, } \frac{x}{2}[2a + (x - 1)\, d] = \text{Sum of terms};$$

$$\therefore \frac{x}{2}\{2(m+n-1) + [(x-1) \times -1]\} = \tfrac{1}{2}(m+n)(m+n-1)$$

$$\begin{aligned} x(2m + 2n - 2 - x + 1) &= (m + n)(m + n - 1) \\ -x^2 + x(2m + 2n - 1) &= (m + n)^2 - (m + n) \\ x^2 - x(2m + 2n - 1) &= -(m + n)^2 + (m + n) \end{aligned}$$

$$\left.\begin{matrix}\text{Completing} \\ \text{the square}\end{matrix}\right\} x^2 - x(2m + 2n - 1) + \left(\frac{2m + 2n - 1}{2}\right)^2$$

$$\begin{aligned} &= \left(\frac{2m + 2n - 1}{2}\right)^2 - (m + n)^2 + (m + n) \\ &= [(m + n) - \tfrac{1}{2}]^2 - (m + n)^2 + (m + n) \\ &= (m + n)^2 - (m + n) + \tfrac{1}{4} - (m + n)^2 + (m + n) \\ &= \tfrac{1}{4} \end{aligned}$$

$$\left.\begin{matrix}\text{Extracting} \\ \text{square root}\end{matrix}\right\} x - \frac{2m + 2n - 1}{2} = \pm\tfrac{1}{2}$$

$$\begin{aligned} \therefore x &= m + n - \tfrac{1}{2} \pm \tfrac{1}{2} \\ &= (m + n - 1), \text{ or } (m + n). \end{aligned}$$

In the former case the last term

$$\begin{aligned} &= (m + n - 1) + [\{(m + n - 1) - 1\} \times -1] \\ &= m + n - 1 - m - n + 2 \\ &= 1. \end{aligned}$$

In the latter case the last term

$$\begin{aligned} &= (m + n - 1) + \{[(m + n) - 1] \times -1\} \\ &= m + n - 1 - m - n + 1 \\ &= \underline{0.} \end{aligned}$$

2. JEAN.—A man aged 45 has a pension of £300 a year during his own life; he wishes to exchange it for another to continue not only during his life, but that of his wife, aged 40. What will be this pension reckoning compound interest at 5 per cent.?

Let us take the expectation of life at 45 to be 20, and at 40 to be 22.

Note.—We have not got the Carlisle Tables of Mortality to get the precise information.

We require the Present Value of the annuity of £300 at 5 per cent. for 20 years, and then we have to calculate the annuity for 22 years that will have the same present value.

Let P denote the present value in pounds, R the amount of one pound in one year, n the number of years, and A the annuity in pounds.

$$\text{Then (1) } PR^n = \frac{R^n - 1}{R - 1} A,$$

$$\therefore P \times \left(\tfrac{21}{20}\right)^{20} = \frac{\left(\frac{21}{20}\right)^{20} - 1}{\frac{21}{20} - 1} \times 300,$$

$$P \times (1\cdot05)^{20} = \frac{(1\cdot05)^{20} - 1}{\frac{1}{20}} \times 300,$$

$$\begin{aligned} \text{Now, } \log(1\cdot05^{20}) &= 20 \text{ times } \log 1\cdot05 \\ &= \cdot0211892991 \times 20 \\ &= \cdot423785982 \\ &= \log 2\cdot6532972; \\ P \times 2\cdot6532972 &= 1\cdot6532972 \times 6000, \\ \therefore P &= \frac{4133243 \times 6000}{6633243} £ \\ &= \frac{4133243 \times 2000}{2211081} £ \\ &= \frac{8266486000}{2211081} £. \end{aligned}$$

$$(2)\ PR^n = \frac{R^n - 1}{R - 1} A,$$

$$\therefore \frac{8266486000}{2211081} \times (1\cdot05)^{22} = \frac{(1\cdot05)^{22} - 1}{\frac{1}{20}} A,$$

$$\begin{aligned} \text{Now, } \log(1\cdot05^{22}) &= 22 \text{ times } \log 1\cdot05 \\ &= \cdot0211892991 \times 22 \\ &= \cdot4661645802 \\ &= \log 2\cdot9252605; \end{aligned}$$

$$\frac{8266486000}{2211081} \times 2\cdot9252605 = 1\cdot9252605 \times 20A,$$

$$\begin{aligned} \therefore A &= \frac{\overset{413324300}{\cancel{8266486000}} \times \overset{5850521}{\cancel{29252605}}}{2211081 \times \underset{3850521}{\cancel{19252605}} \times \cancel{20}} £ \\ &= \frac{2418162496960300}{8513813823201} £ \\ &= \underline{£284 \text{ 0s. } 6\tfrac{3}{4}\text{d.}} \quad \text{Ans.} \end{aligned}$$

3. D. TAYLOR.—Solve:—

$$\left.\begin{aligned} x^2 + y &= 11 \\ y^2 + x &= 7 \end{aligned}\right\}$$

First Method.

$$\left.\begin{aligned} (1)\ x^2 + y &= 11 \\ (2)\ y^2 + x &= 7 \end{aligned}\right\}$$

$$\begin{aligned} \text{Subtracting]}\ x^2 - y^2 - x + y &= 4 \\ (x^2 - y^2) - (x - y) &= 4 \\ (x + y)(x - y) - (x - y) &= 4 \\ (x - y)(x + y - 1) &= 1 \times 4 \end{aligned}$$

$$\left.\begin{aligned} \text{Let } x - y &= 1 \\ \text{And } x + y - 1 &= 4 \end{aligned}\right\}$$

$$\left.\begin{aligned} \text{Then, } x - y &= 1 \\ x + y &= 5 \end{aligned}\right\}$$

$$\begin{aligned} 2x &= 6 \\ \therefore x &= 3. \\ 2y &= 4 \\ \therefore y &= 2. \end{aligned}$$

$$\therefore x = 3 \text{ and } y = 2.$$

Second Method.

$$\left.\begin{aligned}(1)\ x^2 + y &= 11\\(2)\ y^2 + x &= 7\end{aligned}\right\}$$

$$\text{From (1) } y = 11 - x^2;$$

$$\therefore (2)\ (11 - x^2)^2 + x = 7$$

$$121 - 22x^2 + x^4 + x = 7$$

$$x^4 - 22x^2 + x + 114 = 0$$

$$(x - 3)(x^3 + 3x^2 - 13x - 38) = 0$$

$$\text{If } x - 3 = 0$$

$$\text{Then } x = 3;$$

If $x^3 + 3x^2 - 13x - 38 = 0$, we have a cubic equation, which gives imaginary values for x.

∴ The only integral solution is $x = 3$ and $y = 11 - x^2 = 2$.

General.

1. W. R. SEYMOUR.—A sluice gate, 10 feet square, is placed vertically in water, the upper side coinciding with the surface of the fluid; required the pressure on the upper and lower halves of the gate. (*Wormell's* 'Hydrostatics.')

$$\text{Depth of centre of gravity of gate} = \tfrac{10}{2}\text{ ft.}$$

$$= 5\text{ ft.}$$

$$\text{,,} \quad \text{,, upper half} = \tfrac{5}{2}\text{ ft.};$$

$$\therefore \text{Pressure on whole gate} = (10^2 \times 5 \times 1000)\text{ oz.}$$

$$= 500{,}000\text{ oz.}$$

$$= 31{,}250\text{ lbs.};$$

$$\text{,, upper half} = (10 \times 5 \times \tfrac{5}{2} \times 1000)\text{ oz.}$$

$$= 125{,}000\text{ oz.}$$

$$= 7{,}812\tfrac{1}{2}\text{ lbs.};$$

$$\text{,, lower half} = (31{,}250 - 7{,}812\tfrac{1}{2})\text{ lbs.}$$

$$= \underline{\underline{23{,}437\tfrac{1}{2}}}\text{ lbs.}$$

$$\text{Or, centre of gravity of lower half} = 5\text{ ft.} + \tfrac{5}{2}\text{ ft.}$$

$$= \tfrac{15}{2}\text{ ft.};$$

$$\therefore \text{Pressure on lower half} = (10 \times 5 \times \tfrac{15}{2} \times 1000)\text{ oz.}$$

$$= 375{,}000\text{ oz.}$$

$$= \underline{\underline{23{,}437\tfrac{1}{2}}}\text{ lbs.}$$

2. S. YEARSLEY.—Kindly repeat your query as there is a word which is not intelligible, and we have not the questions to which we could refer.

3. MATER.—Try Lock's 'Trigonometry,' Part I., C. Smith's or Todhunter's 'Algebra,' and Todhunter's 'Euclid.' Chambers' 'Euclid' you would find very useful. The questions you name can be purchased in a 6d. pamphlet. They are published by Eyre and Spottiswoode. The syllabus is contained in the directory, but you only want parts of it. You could have them sent to you direct by post by writing to the department and enclosing 2d. in stamps. You need not prepay the letter.

4. J. J. M.—You have to take groups, and the subjects in one group where there are more than one are considered a whole. What you imply is that if you did badly in one or more subjects you might fail although you did excellently in the others. There is not much fear on that head. Try to do moderately well in all the subjects you are examined in.

5. JONES.—There are certain subjects fixed and others vary from time to time. You will obtain all information by writing for a copy of the syllabus to the Registrar, Burlington House, Piccadilly, W.C.

6. H. T. T.—In Todhunter's treatise on Conic Sections the subject is treated analytically. For the Geometrical treatment you can use Richardson's book (Rivington & Co.) or Drew's 'Conic Sections.' Wilson's 'Solid Geometry' is very good.

7. EN TENEBRES.—Yes we hope so. We do not understand the second question. All who take first year's papers have to take Mental Arithmetic.

8. B.Sc.—The syllabus covers a good deal. All the books you name are good, the author of the 'Experimental Physics' we could not make out. You had better make arrangements for working at the subject practically. You might find Glazebrook's 'Optics' useful. Formerly it was almost necessary to read Maxwell's 'Heat,' a very excellent and in parts very difficult text-book. Balfour Stewart's 'Heat' is good, so is Tait's.

9. A. M.—We do not profess to give an exhaustive list. Fowne's manual of 'Organic Chemistry' is good. Add to it Remsen's 'Organic Chemistry,' or Morley's; 'Deschanel,' Ganôt; 'Optics,' Glazebrook; 'Practical Physics' by B. Stewart, or Glazebrook; Maxwell's 'Heat' and Tait's; Foster's 'Physiology, Theoretical and Practical.' You are not likely to succeed in Physiology unless you get practical instruction in the use of the instruments of research. The last question is in this case of no importance.

10. LEX.—Erskine May is the author of a work likely to help you. Have you consulted Hallam's 'Constitutional History'? A public library would be likely to contain both.

11. INDECIS.—If you find that teaching is irritating and disheartening work by all means turn your attention to something else. It will be better for you and better for the children. We cannot undertake to give advice on the choice of a profession. If you have no higher motive than getting the most for doing the least you are not likely to succeed in anything. If after all you decide to become a teacher, get the completest training within your reach.

12. W. A.—In each case write to the Secretary. He will give you all needful information.

13. EVA.—We only distinguish two kinds of writing on the sheet, large and small. Both are carefully written. They are legible and bold. They have no other merit. There seems to be no attempt at uniformity or correctness of shape, much less of elegance. Use Cowham's Copy Books. There may be others as good but we do not know them; there are none better.

14. G. CAIRNS.—Read Syllabus and in connection with it parts of Fownes, Roscoe, Miller; for Practical, Valentine's Analysis (new edition).

15. PARCHMENT.—Smith's 'Latin Grammar' is clear and sufficient. The key to the book you name can be got at the publisher of the composition if you satisfy him that you are a *bonâ fide* student. Second part, yes.

16. PLYMOUTH.—If you passed in the four subjects before May, 1888, you can complete your D by passing either this year or next year the black board drawing from memory, as before. The examination is held at the Training colleges early in November. You are probably too late for this year, but you might possibly find a vacancy if you applied to a Training College at once.

17. S. E. POLAK.—(1) Yes, either this year or next year, not later. (2) About October the 8th. (3) There is no reliable book; Poynter's Drawing for the Standards, published by Blackie, is good; the parts containing instruction in Model Drawing might be helpful.

18. E. M.—We cannot give you the information you ask. You should apply at once to the Secretary of the Science and Art Department.

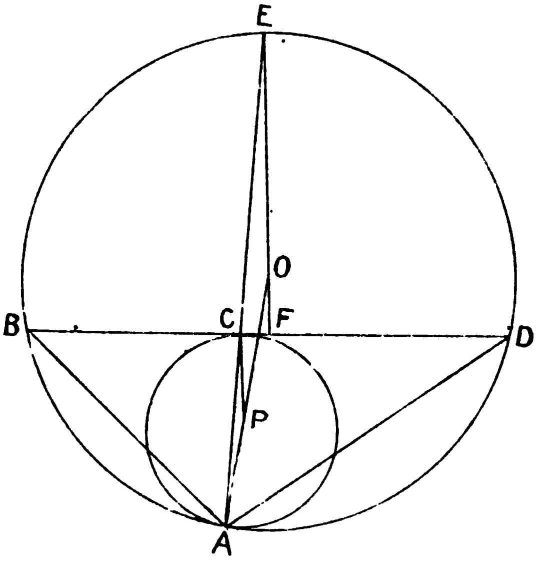
19. IGNORAMUS.—The reference in page 334 is to those who take 2nd year papers. The Algebra paper has hitherto contained some questions in Mensuration. In future the questions in Mensuration are only to be taken by those who have passed satisfactorily in Arithmetic.

20. IN DIFFICULTIES.—There are no ambiguities in the syllabus. You are obliged to take certain groups, and you cannot take more than four, hence you are precluded from taking the language group at all.

21. C. W.—Very often one book will not do what you want. Use the book you have and supplement it with any other manuals you possess, such as those of Lock, Magnus, Todhunter.

Geometry.

1. SUBTRISTIS.—If two circles touch each other internally, any chord of the greater circle which touches the less shall be divided at the point of its contact into segments, which subtend equal angles at the point of contact of the two circles. (*Todhunter.*)



Let the two circles touch each other at A.

Let O be the centre of the larger circle, and P the centre of the smaller.

Let BCD be a chord of the larger circle touching the smaller circle at C.

Then BC, CD shall subtend equal angles at A.

Join AC, and produce it to cut the larger circle at E.

Now A, P, O are in one straight line. (III. 11.)

Draw the line AO. Join AB, AD, PC, OE, and produce EO to meet BD in F.

Proof.—$\left.\begin{array}{l}\angle \text{PAC} = \angle \text{PCA} \\ \text{and } \angle \text{OAC} = \angle \text{OEA}\end{array}\right\}$ (I. 5.)

$\therefore \angle \text{PCA} = \angle \text{OEA}$; (Ax. 1.)

Wherefore OE is parallel to PC. (I. 28.)

Now PC is at right angles to BD, (III. 18.)

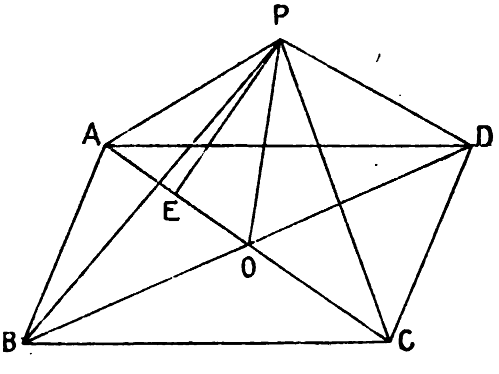
$\therefore$ EF is at right angles to BD; (I. 29.)

Wherefore EF bisects BD (III. 3.), and therefore arc BE = arc ED;

$\therefore \angle \text{BAE} = \angle \text{DAE}$. (III. 27.)

Q. E. D.

2. THE OLD MAN OF CARMEL.—If a circle be described round the point of intersection of the diameters of a parallelogram as a centre, show that the sum of the squares on the straight lines drawn from any point in its circumference to the four angular points of the parallelogram is constant. (*Todhunter.*)



Let ABCD be a parallelogram, and let the diagonals AC, BD intersect at O.

Let a circle be described from O as centre, and let P be any point on the circumference of this circle. Join PA, PB, PC, PD, PO.

Proof.—In any triangle the sum of the squares on the sides of the triangle is equal to twice the square on half the base, together with twice the square on the straight line which joins the vertex to the middle point of the base.

Draw PE perpendicular to AC. (I. 12.)

Then, $\text{PA}^2 = \text{AO}^2 + \text{PO}^2 - 2\text{AO.OE}$, (II. 13.)

$\text{PC}^2 = \text{CO}^2 + \text{PO}^2 + 2\text{CO.OE}$ (II. 12.)

$= \text{AO}^2 + \text{PO}^2 + 2\text{AO.OE}$;

$\therefore \text{PA}^2 + \text{PC}^2 = 2\text{AO}^2 + 2\text{PO}^2$. (Ax. 2.)

This remains constant at whatever point of the circumference P may be.

Similarly the sum of the squares on PB, PD may be proved to be equal to twice the square on BO and twice the square on PO, and therefore it also remains constant.

$\therefore$ Sum of squares on PA, PB, PC, PD remains constant.

Q. E. D.

Pupil Teachers and the Royal Commission on Education.

MANY of the Pupil Teachers who read this Magazine will know that for more than two years a Royal Commission has been sitting, inquiring into the working of the Elementary Education Acts. During that time they have taken a great deal of evidence, that concerning Pupil Teachers being very important. There is not the slightest doubt that changes will be made on the lines of the report of the Commission. We wish the Pupil Teachers who read our pages to be prepared for these changes. Considerable complaints were made about the inadequate preparation of Pupil Teachers for the training given in the Training Colleges. These complaints were not without foundation. Nearly 29 per cent. of the Pupil Teachers who sit at the Scholarship Examination fail to pass it, although it covers only the work of the Pupil Teachership. Of those who do pass the greater proportion pass only in the second and third classes. This shows that either there has been a great want of ability or attention to study on the part of the Pupil Teacher, or that he has been badly taught. The Commissioners seem to think that there is room for improvement, both in the Pupil Teacher himself and in the method of his training. Statistics were laid before them which showed that Pupil Teachers who were taught in central classes did better than those who were taught only at their own schools. They therefore strongly recommend that wherever possible Pupil Teachers should be taught in central classes, or at least that the teaching at the schools by their own masters or mistresses should be supplemented by teaching in such classes. Now it is evident that in very many of the villages and smaller towns of the country such central classes cannot be formed. We trust, therefore, that Pupil Teachers and their Head Teachers will make still more use of the aid we try to render them in these columns every month. By following the advice we give, and diligently working the exercises we from time to time provide, much progress will be made, faults will be corrected, help obtained, and some of the advantages of central class teaching secured.

Another of the recommendations of the Commissioners is that more time should be allowed to Pupil Teachers for their own studies, especially in their first year of service. We think that this is greatly needed. A good foundation can be better laid between fourteen and sixteen than afterwards. Experience has taught us that where Pupil Teachers do nothing beyond the mere requirements of Schedule V. of the Code in their early years they seldom get beyond it afterwards, and no candidate can get a good place in the Scholarship List who has not some knowledge of science and languages in addition. We would especially urge Pupil Teachers, who are now in the early years of their apprenticeship, to get beyond the mere requirements of their year in all their ordinary subjects, so as to leave more time for extra subjects afterwards.

A Pupil Teacher who has passed Standard VII. before entering on his apprenticeship should have a very good knowledge of all the ordinary subjects taught in the school. It should not be much trouble for such an one to fairly master the whole of the first year's course in six months. The other six months might very well be employed in doing something beyond the requirements of the year. The whole of the grammar and arithmetic of the second year should be attempted, and a language commenced.

Some of the Commissioners are strongly of opinion that no ex-Pupil Teachers should be allowed to be employed at the close of their apprenticeship who do not at least pass the Scholarship Examination in the first or second division. If their opinions are accepted, and there is great likelihood that they will be, a vast improvement must take place, for during the past four years an average of more than 1,100 have failed each year even to get into the third division. It will be well, therefore, for those who wish to follow the profession after their apprenticeship is over, to work the harder now, so that they may not fail when it comes to a close.

All the Commissioners agree in the opinion that better arrangements should be made for removing Pupil Teachers who are unfit for their work. That unfitness very often arises from inattention on the part of the Pupil Teacher to instructions given him by the Head Teacher. We cannot have any sympathy with one who does not do his utmost to follow a good pattern given him, but we can and do sympathise with a Pupil Teacher who is not properly instructed and trained. Evidence was given to show that nearly 25 per cent. of the students in at least two colleges had not received their due amount of instruction. The report recommends that Pupil Teachers be not indentured except in schools where due care will be taken of their instruction and training, and where such has not been taken the privilege of having Pupil Teachers should be removed.

As we have already said, we cannot tell how soon, or how many of, these recommendations will be accepted by the Government and become law. They will all tend to improve the education of the country, and we strongly advise both Head Teachers and Pupil Teachers who are anxious for the well-being of themselves and their schools to adopt them, or bring themselves abreast of them at as early a date as possible.

The Glass of Water; or, Cause and Effect.

(Comedy in Five Acts.)

LE VERRE D'EAU; OU, LES EFFETS ET LES CAUSES.

(Comédie en Cinq Actes.)

Scène V.	Scene V.
Abigaïl, Bolingbroke, la Duchesse.	Abigaïl, Bolingbroke, the Duchess.

* * * * * * *

Bolingbroke.

Parente fort éloignée, sans doute...	A very distant relation, no doubt,
mais enfin, cousine de la duchesse de Marlborough,	but still, a cousin of the Duchess of Marlborough,
de la surintendante de la reine, qui,	the Superintendent of the Queen's household, who,
dans sa sévère impartialité,	in her strict impartiality,
hésite et se demande	hesitates and debates with herself
si elle est d'assez bonne maison	whether she is of a family noble enough
pour approcher de Sa Majesté.	to approach the Queen.
Vous comprenez, madame, que pour moi,	You understand, madam, that, as far as I am concerned,
qui suis un écrivain usé et passé de mode,	I am a hackneyed writer, and altogether out of fashion,
il y aurait dans le récit de cette aventure	but there would be in the story of that adventure
de quoi me remettre en vogue auprès de mes lecteurs,	enough (wherewith) to bring me into fashion again with my readers,
et que le journal *l'Examinateur* aurait beau jeu	and the *Examiner* would have a fine opportunity
dès demain à s'égayer sur la noble duchesse,	from to-morrow to make merry at the expense of the noble Duchess,
cousine de la demoiselle de boutique...	the cousin of a shopgirl.
Mais rassurez-vous, madame,	But be reassured, Madam,
votre amitié est trop nécessaire à votre jeune parente,	your friendship is too necessary to your young relation
pour que je veuille la lui faire perdre;	for me to wish to cause her to lose it;
et à la condition qu'elle sera aujourd'hui admise	and on condition that she shall to-day be admitted by you
par vous dans la maison de Sa Majesté,	into her Majesty's household
je m'engage sur l'honneur	I give you my word of honour
à n'avoir jamais rien su de cette anecdote,	never to have heard anything of this anecdote,
quelque piquante qu'elle soit...	however pungent it may be.
J'attends votre réponse.	I await your reply.

The Duchess.

[*fièrement.*	[*proudly*
Je ne vous la ferai point attendre.	I will not keep you waiting for it.
Je devais présenter mon rapport à la reine	I am to present my report to the Queen
sur l'admission de mademoiselle,	as to the admission of mademoiselle,
et qu'elle soit ou non ma parente,	and whether or not she is my relative,

cela ne changera rien à ma décision ;	that will change nothing in my decision ;
je la ferai connaître à Sa Majesté...à elle seule !...	I shall make it known to her Majesty and to her alone.
Quant à vous, monsieur, il vous suffira de savoir	As to you, Sir, it will be sufficient for you to know
que je n'ai jamais rien accordé à la menace,	that I have never yielded to threats,
arme impuissante, du reste, que je dédaigne...	a powerless arm, moreover, which I despise,
et si j'y ai recours aujourd'hui,	and if I have recourse to it to-day,
c'est que vous m'y aurez forcée...	it is you who have forced me to do so.
Quand on est publiciste, monsieur de Saint-Jean,	When one is a journalist, Monsieur de St. Jean,
et surtout quand on est de l'opposition,	and especially when one belongs to the Opposition,
avant de vouloir mettre de l'ordre	before wishing to arrange (settle)
dans les affaires de l'État,	the affairs of the State,
il faut en mettre dans les siennes.	one must first arrange one's own.
C'est ce que vous n'avez pas fait...	That is what you have not done.
Vous avez des dettes énormes	You have enormous debts,
près d'un million de France,	nearly a million francs,
que vos créanciers impatients et désespérés	which your creditors, impatient and desperate,
m'ont cédé pour un sixième payé comptant...	have sold to me for one-sixth, ready money.
J'ai tout racheté...moi, si avide, si intéressée...	I have bought them all, I, so greedy, so selfish.
Vous ne m'accuserez pas cette fois	You will not accuse me this time
de vouloir m'enrichir...	of wishing to enrich myself,
(*souriant*) car ces créances sont, dit-on, désastreuses...	(*smiling*) for these debts, they say, are ruinous,
mais elles ont un avantage...	but they have one advantage,
celui d'emporter la contrainte par corps...	that of carrying with them the right of arrest for debt,
avantage dont je n'ai pu profiter encore	an advantage which I have not yet been able to profit by
avec un membre de la chambre des communes...	with a member of the House of Commons...
mais demain finit la session,	but to-morrow the session ends,
et si la piquante anecdote dont vous parliez tout à l'heure	and if the pungent anecdote of which you spoke just now
paraît dans le journal du matin...	appears in to-morrow morning's paper,
le journal du soir annoncera	the evening paper will announce
que son spirituel auteur, monsieur de Saint-Jean,	that its witty author, Monsieur de St. Jean,
compose en ce moment, à Newgate,	is composing at this hour, in Newgate,
un traité sur l'art de faire des dettes...	a treatise on the 'Art of running into Debt.'
Mais je ne crains rien, monsieur,	But I have no fear, my lord,
vous êtes trop nécessaire à vos amis et à l'opposition	you are too necessary to your friends and the Opposition
pour vouloir les priver de votre présence,	to wish to deprive them of your presence,
et quelque pénible que soit le silence	and however painful silence may be
pour un orateur aussi éloquent,	for an orator so eloquent (as yourself),
vous comprendrez mieux que moi	you will understand even better than myself
encore la nécessité de vous taire.	the necessity of silence.
[*Elle fait la révérence et sort.*	[*She curtseys and departs.*

Scène VI.	Scene VI.
Abigaïl, Bolingbroke.	Abigail, Bolingbroke.

Abigail.

Eh bien ! qu'en dites-vous ?	Well ! what do you say to that ?

Bolingbroke.

[*gaîment.*	[*gaily.*
Bien joué, vrai Dieu !...	Well played, Egad,
c'est de bonne guerre...	it is fair play.
J'ai toujours dit que la duchesse	I have always said that the Duchess
était une femme de tête et surtout d'exécution.	was a strong-minded and above all a resolute woman.
Elle ne menace pas ; elle frappe...	She does not threaten, she strikes...
Et cette idée de me tenir sous sa dépendance	and this idea of having me at her mercy
en acquittant mes dettes... c'est admirable !...	by paying my debts is admirable,
surtout de sa part...	especially for her.
Ce que n'auraient pas fait mes meilleurs amis,	What my best friends would not have done,
elle l'a fait...elle a payé pour moi...	she has done ; she has paid all for me.
il faut alors qu'elle ait une haine...	She must therefore nourish such a hatred...
qui excite mon émulation et mon courage...	as to excite my emulation and courage.
Allons, Abigaïl, du cœur.	Come, Abigail, take heart.

Abigail.

Non, non...je renonce à tout,	No, no, I give up everything,
il y va de votre liberté !	your liberty is at stake.

Bolingbroke.

[*gaîment.*	[*cheerfully.*
C'est ce que nous verrons !	That is what we shall see
et par tous les moyens possibles...	and by every possible means.
(*Regardant une pendule qui est sur un des panneaux à droite.*)	(*Looking at a clock on one of the panels to the right.*)
Ah, mon Dieu ! voici l'heure de la chambre...	Good heavens ! It is time to go to the House (of Commons).
je ne peux y manquer...	I must not fail to be there.
je dois parler contre le duc de Marlborough	I have to speak against the Duke of Marlborough
qui demande des subsides...	who demands more subsidies.
Je prouverai à la duchesse	I will prove to the Duchess
que je m'entends en économie...	that I perfectly understand economy.
je ne voterai pas un schelling...	I will not vote him one shilling.
Adieu ! je compte sur Masham,	Good bye, I count on Masham,
sur vous, et sur notre alliance !...	on you, and on our alliance.
[*Il sort par la porte à gauche.*	[*Exit through the door on the left.*

ACT II.

Scène I.	Scene I.
La Reine, un huissier du palais.	The Queen, an Usher of the Palace.

* * * * * * *

The Queen.

Tant pis...	That is a pity (lit. so much the worse).
je suis fâchée de ne pas les avoir reçus...	I am sorry that I did not see them,

Monsieur de Saint-Jean, surtout !...	especially Monsieur de St. Jean !
Quand il était au pouvoir...	When he was in office,
tout allait au mieux...	everything went on smoothly.
mes matinées étaient moins longues...	My mornings were not so long.
je ne m'ennuyais pas tant... et aujourd'hui,	I was not so fatigued, and to-day,
en l'absence de la duchesse,	in the absence of the Duchess,
cela se rencontrait à merveille...	they came so opportunely,
c'était comme un fait exprès...	it seemed as if it were done on purpose,
un bon hasard.—J'aurais pu causer avec lui,	a lucky chance.—I could have conversed with him
et l'avoir renvoyé,	and have dismissed him,
c'est d'une maladresse...	it is very annoying.

Thompson.

Madame la duchesse me l'avait tant recommandé...	The Duchess had strictly ordered me,
règle générale : toutes les fois que	as a general rule, everytime that
monsieur de Saint-Jean se présentera...	Monsieur St. Jean presented himself—

The Queen.

Oh !...c'est la duchesse !... c'est différent !	Oh ! the Duchess ! That's quite different.
Et monsieur de Saint-Jean n'a rien dit ?	Did Monsieur St. Jean say nothing ?

Thompson.

C'est lui qui venait d'écrire,	It was he who wrote
dans le salon d'attente,	in the waiting room,
le papier que j'ai remis à Votre Majesté.	the paper which I gave to your Majesty.

The Queen.

[*prenant vivement le papier sur la table.*	[*hastily taking the paper off the table.*
C'est bien.—Laisse-moi.	Very good. Leave me.
[*Thompson sort.*	[*Exit Thompson.*

The Queen.

[*lisant.*	[*reading.*
'Madame, mes collègues et moi	'Madame, my colleagues and myself
demandions audience à Votre Majesté !	ask audience of your Majesty !
Eux pour affaires d'Etat,	They for business of the State,
et moi pour jouir de la vue de ma souveraine,	and I to enjoy the sight of my Sovereign,
qui depuis si longtemps m'est interdite.'	who has been so long forbidden to me.'
Pauvre sir Henri ! 'Que la duchesse éloigne	Poor Lord Henri! 'That the Duchess should keep away
de vous ses ennemis politiques, je le conçois ;	from you her political enemies,—that I can understand ;
mais sa défiance va jusqu'à repousser	but her distrust goes so far as to drive away a poor girl
une pauvre enfant dont la tendresse et les soins	whose tenderness and loving cares
eussent adouci les ennuis	would have soothed the tediousness (ennui)
dont on accable Votre Majesté.	which overwhelms your Majesty.
On lui refuse la place	They have refused her the place
que vous vouliez lui donner près de vous,	which you wished to give her about your person,
en alléguant qu'elle est sans famille ;	by alleging that she has no family connections ;
et je vous préviens, moi, qu'Abigaïl Churchill est	but I inform you that Abigail Churchill is
cousine de la duchesse de Marlborough.'	a cousin of the Duchess of Marlborough.'
(*S'arrêtant.*) Est-il possible ! ...(*Lisant.*)	(*Stopping.*) Is it possible ? (*Reading.*)
'Ce seul fait vous donnera la mesure du reste...	'This single fact will give you the measure of the rest.
que Votre Majesté en profite	May your Majesty profit by it
et veuille bien en garder le secret	and be so gracious as to preserve the secret
à son fidèle serviteur et sujet, &c.'	for her faithful servant and subject, &c.'
Oui, c'est la vérité.	Yes, it is true.
Henri de Saint-Jean est un de mes fidèles serviteurs...	Henri de St. Jean is one of my most faithful servants ;
mais ceux-là, je ne suis pas libre de les accueillir...	but those I am not free to receive,
lui, surtout...ancien ministre,	him especially—an old minister,
je ne puis le voir sans exciter la défiance	I may not see him without exciting the distrust
et les plaintes des nouveaux !	and complaints of the new ministers !
Ah ! quand ne serai-je plus reine,	Oh ! when shall I no longer be a Queen
pour être ma maîtresse !	to become my own mistress!
Dans le choix même de mes amis,	Even in the choice of my friends,
demander avis et permission	to ask the advice and permission
aux conseillers de la Couronne,	of the councillors of the Crown,
aux Chambres, à la majorité...	of the Houses, of the majority
à tout le monde enfin...c'est à n'y pas tenir...	of everybody even, is unbearable.
c'est un esclavage odieux, insupportable,	It is a slavery, hateful and intolerable,
et ici du moins, je ne veux obéir à personne,	and in this, at least, I will not obey anyone,
je serai libre chez moi dans mon palais.	I will be free in my own house and palace.
Oui, et quoi qu'il puisse arriver, j'y suis décidée.	Yes, whatever may happen, I am decided upon it.
(*Elle sonne, Thompson paraît.*)	(*She rings, Thompson appears.*)
Thompson, rendez-vous à l'instant dans la Cité,	Thompson, go immediately to the City,
chez maître Tomwood, le joaillier...	to Mr. Tomwood's, the jeweller.
vous demanderez miss Abigaïl Churchill,	You will ask for Miss Abigail Churchill,
et vous lui direz	and you will tell her
qu'elle vienne à l'instant même au palais.	that she is to come immediately to the palace.
Je le veux, je l'ordonne moi, la reine !...allez !...	I will it, I order it, I, the Queen ! Go !

Thompson.

Oui, madame. [*Il sort.*	Yes, Madame. [*Exit.*

The Queen.

L'on verra si quelqu'un ici a le droit	We shall see whether anyone here has the right
d'avoir une autre volonté que la mienne,	to have any other will but mine,
et d'abord la duchesse, dont l'amitié et les conseils continuels...	and in the first place, the Duchess, of whose friendship and everlasting advice
commencent depuis longtemps à me fatiguer...	I have long ago begun to grow tired...
Ah ! c'est elle !...	Ah ! here she is !
(*Elle s'assied et serre dans son sein*	(*She sits down and thrusts into her bosom*
la lettre de Bolingbroke.)	*Bolingbroke's letter.*)

Owing to pressure on our space we are compelled to abridge the two French pieces 'Jeanne d'Arc' and 'Le Verre d'Eau.' In the November and December issues we shall therefore insert only the most difficult parts of each piece. Should any Subscriber desire further assistance we shall be happy to reply to any query upon receipt of a stamped and addressed envelope.

Mr. Vere Foster's Prize Competition.

WE have just received the results of the competitions for drawing and writing annually awarded by Mr. Vere Foster for the encouragement of art. Since the institution of the prizes in 1870, 5,128 prizes have been given away, amounting to £2,354 7s. 6d., and the pupils of upwards of 3,800 schools of all classes have taken part in the competition, which has extended to every county and every large town in Great Britain and Ireland.

During the past year there have been 570 competitors in ordinary writing, 25 in plain and ornamental lettering, 288 in drawing, and 74 in painting. 403 boys have competed, and 491 girls, representing 22 counties in Ireland, and 46 in Great Britain.

The highest prize awarded for writing of copies of the original series has been awarded to Donald M'Dougall, aged 16, of Drumour Public School, Perthshire. The second prize is awarded to Mary K. Kavanagh, aged 10, Monasterevan, Kildare. In drawing and painting the work continues to be very satisfactory, for though the quality of the work done has often been exceeded there never has before been so large a quantity of good work, and such an absence of rubbish. This has resulted in a great addition being made to the number of prizes originally offered. We append the names of those who obtained the most valuable prizes. Hamilton, James T.; Martin, Anne J.; Fleming, Agnes; Aikman, W. K.; Richards, Lucy, E.; Butcher, Adah; Powell, R.; Gebbie, Frank; Coath, Helen; Hamilton, E.; Jenkins, G. H.; Nash, A. J.; Ferrier, May; Jones, Lionel J.; Carder, W.

For the annual competition in 1889, prizes for writing and lettering are offered to the extent of £269; for drawing and painting, £356. Full particulars can be obtained from Messrs. Blackie & Sons, 49 & 50, Old Bailey, London.

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Publications Reviewed.

A Treatise on Plane Trigonometry containing an account of Hyperbolic Functions.

By John Casey, LL.D., F.R.S. London: Longmans, Green and Co.

The book which we have before us contains, we believe, the most remarkable and complete treatment of its subject which has yet appeared in the English language. Too many writers have supposed that a knowledge of Trigonometry only was necessary to enable them to write a book thereupon, and it has been rare indeed that a writer in every direction as competent as Dr. Casey, or with a mathematical eye-sight so far-reaching, has grappled with an elementary subject like the present. Dr. Casey, fortunately for us, was known as an eminent mathematician before he became a writer of text-books. His investigations into Geometry and Higher Algebra have gained him a European reputation, and when the first of his class text-books, the 'Sequel to Euclid,' appeared some years ago we welcomed it in these columns as 'extraordinarily neat' and extremely satisfactory even in the form it then assumed, which has since, in subsequent editions, been improved almost out of all likeness to its former self. This was followed in the course of last year by an equally remarkable treatise on Analytical Geometry, and it is little to be wondered at, therefore, if we open the present volume with very high anticipations. Nor are we disappointed. Alike in grasp and clearness this book out-distances its only real rival, the venerable Todhunter. Of course we cannot help differing in a few minor points from our author, but on the whole we are more at one with him than we have been with any previous author.

The examples, more than a thousand in number, are remarkably well-chosen and accurate. They are adapted not only to form a Trigonometrician but also to develop a comprehensive mathematical talent. Many of them are original and at least one third have not appeared in any previous text-book. In every case some are solved as specimens (a point in which all Todhunter's works, by the way, are very deficient) and the answers of the remainder are given at the end of the book where we have the welcome novelty of a tolerably complete index of the subject-matter, and authors' names.

By making a short survey of the work we shall be enabled to convey to our readers some idea of its scope and contents, and also to criticise a few of the details. The Trigonometrical ratios are defined as lines in a circle of unit radius, and this is clearly the definition which Dr. Casey prefers, although the ordinary ratio definition is also given. Here we are seriously at issue with our author for we think this definition dangerous in the extreme (since the schoolboy will promptly forget the unity of the radius) and believe that it ought only to be admitted as explaining the primary signification of the terms *sine*, *tangent*, &c. A natural result of this definition, to which we also object as extremely likely to prove misleading, is that such phrases as 'sine of the arc,' &c., are in constant use. In finding the formulæ for the ratios of the sum of two angles two proofs are given which are new to ordinary text-books, one a deduction from Ptolemy's Theorem (VI. D.) and another due to Mr. Nichols. Besides this we find, of course, the ordinary proofs and a neat and easy proof for angles of any magnitude, so that here we have almost an *embarras de richesse*. It might have been as well, perhaps, considering the geometrical tendencies of examiners, to add proofs by geometry as well as the analytical ones given, of the formulæ numbered (96)—(98), (157)—(160), and a few others, all of which are susceptible of neat and instantaneous treatment thereby. In Art. 61, a verbal statement of a rule is given very dangerously and inexactly, as follows—

'Diff. of the cosines = 2 sin ½ sum, sin ½ diff.'

and no notice board is erected at the mouth of the pitfall of signs which lies hidden here. A slight discussion of the rational basis for the use of the inverse notation might quite well have been added (to Art. 30), a hint, we mean, such as Todhunter gives, that the use of the index -1 here differs only from its ordinary use in that the subject of its operation is a function, not a quantity. As it is we fear that the student may confuse

$$\text{Sin}^{-1} x \text{ and } (\sin x)^{-1}$$

The methods of Delambre and Maskelyne for finding the logarithmic sines of small angles are relegated to the examples. We should have liked a line pointing out the use to which their authors applied these theorems, more particularly as Maskelyne's method is the one adopted in Chambers' widely used Mathematical Tables. The Properties of Triangles are rather curtly treated. Too many references to the 'Sequel to Euclid' are made, and we have not noticed that it is anywhere stated which edition of the 'Sequel' is meant. We confess that we think that Dr. Casey might with advantage have lengthened his book 20 or 30 pages, by giving an elementary account of the Geometry of the Triangle, complete in itself, referring to the 'Sequel' only for the more recondite propositions. We are glad to notice that mention is made of the Brocard Points, and of Malfatti's Problem. But surely the Nine Point Circle ought to have been introduced although its treatment is so largely geometrical. In the figure on p. 176, the angles into which the angle A is sub-divided are wrongly designated. They should be as in the figure on p. 177. The section on Maxima and Minima might be extended so as to include those problems on this subject which can be solved by making equal the roots of a quadratic equation in the variable. This would admit a large class of interesting examples which are at present excluded. A formula, due to Bretschneider, is given for the area of any quadrilateral in forms of sides and diagonals. We think that some proof of the more important results of De Moivre's Theorem which does not involve the use of imaginary quantities is desirable. Two pages are given to the Binomial Theorem, we can scarcely see why. We are glad to notice the introduction of Bernouilli's numbers and the proof of their chief properties. A reference should be added after Ex. 42 on p. 214 to Exx. 6, 7 on p. 229, where other properties of the numbers are proved. This is also omitted from the index. If this were done we should be provided with a tolerably complete résumé of their properties. Chapter VIII., pp. 241—259, is given to a remarkable and elegant discussion of 'Hyperbolic Trigonometry.' Dr. Casey adopts sh, ch, th instead of the more usual sinh, cosh, tanh. We should suggest however that it is *extremely* advisable for teaching purposes to have names which are capable of being pronounced, and should recommend that in any subsequent edition Dr. Casey should introduce such, and we believe that his lead would be followed. There are two misprints in line 4, p. 209, but as a rule the printing is extremely careful and accurate. We believe that for the printer's sake the use of the rectangular sign for factorial should be abolished in favour of the recent Cambridge substitute of ! In Exx. XXXVII., 23—27, 51 it should be stated that primes only are involved in the dexter. The result of Art. 184 might profitably be stated in words inasmuch as it is extremely useful to remember it.

We have by no means adverted to all the points which we had marked for notice, but we must conclude. We wish the book all success. We have mentioned many points, most of them small, on which we believe it to be capable of improvement, but we repeat that it is in our opinion not only the best book on the subject but that it is an eminently good book.

A School Grammar.

By David Salmon. London: Longmans, Green and Co.

Mr. Salmon has written a thoroughly serviceable School Grammar. In a book of 260 pages, he has provided abundance of exercises of such a kind as to be easily read and understood by young children. That it may be seen how copious are the examples, we notice that the first fifty pages are taken up with the parts of speech and exercises thereon, based upon the principle that examples must lead up to definitions, and definitions be applied to examples. The second part, which deals with the classification and inflexion of nouns, is fully treated. Some exception may be taken to the statement that the active voice belongs only to transitive verbs. If voice is a form of the verb, and the active voice receives its name because the verb shows that the person or thing named by the subject is acting or doing, then intransitive verbs take this form, although they do not take the passive form. But even intransitive verbs do take the passive form when a preposition is joined to them. It does not mend matters by saying that Intransitive Verbs might be spoken of as of Neuter Voice. Mr. Salmon has followed Dr. Morris in his divisions of verbs into strong and weak, classing as weak verbs those which, although forming their past tense and perfect participle by adding -t or -d, also change the vowel sound. Mr. Salmon defines strong verbs as those which form their past tense and perfect participle by a change of vowel sound. We are of opinion, therefore, that it not only simplifies matters very considerably, but is quite allowable to call those words which do both, irregular or strong verbs. *Light, lit, lit; sell, sold, sold; speed, sped, sped,* may be given as examples of verbs which we think may very justly be called strong verbs, and not weak. Mr. Salmon gives a very full division of the tenses of verbs as the divisions present, past and future indefinite imperfect, perfect and perfect continuous will show. We are glad to note, however, that he does not insist upon this minute subdivision as of special importance, except as being useful to show the various shades of meaning which may be conveyed in composition by means of auxiliaries. Even these minute subdivisions do not include all which may be formed if the word *do* is treated separately when used as an auxiliary. We notice that Mr. Salmon has introduced an exercise for the correction of bad grammar. We are very strongly of opinion that such exercises are of very great service, every error being capable of correction on fixed principles. The principles themselves become more firmly fixed in the mind by the necessity for their application in incorrect sentences being called to mind. We should be glad to see the practice more frequently followed in this subject. We commend very heartily the volume which Mr. Salmon has produced. Every teacher will find in it abundance of work, both oral and written, for his classes.

A First History of the English People.

Four Volumes. By Amy Baker. London: Swan, Sonnenschein, Lowry and Co.

We do not remember reading any book of history for schools with such keen pleasure as we have derived from the perusal of these four volumes of Miss Baker. The style is attractive, because it is picturesque and vivid, and in some portions, as in the reign of William III., even rapid and exciting. It is based, as the writer acknowledges, on Green's 'Short History of the English People.' But while its style may be traced in part to its forerunner, it has special merits of its own in being simpler and better adapted to the intelligence of beginners in historical study. For it must be understood that Miss Baker's work is less ambitious in its aim and less comprehensive in its scope than Green's 'Short History.'

Chapters adapted from Kingsley's 'Hereward,' Lytton's 'Last of the Barons,' and other works of the kind, enliven the course of the narrative, and help the young reader more nearly to realise the sort of life led by the English of former times.

The progress of religious liberty, the development of constitutional government, and literary history, receive due attention, and are treated in a broad spirit of toleration and patriotism.

We note with pleasure the well-chosen poetical mottoes which head the various chapters; and the mnemonic verses appended to each volume, written by the Miss Ella Baker whose sad death was recently recorded, are far superior to most verses of the kind.

A few slight errors need correction. On page 57 of Volume I. the name Edmondsbury is spelt two ways in one paragraph, and in the heading of Chapter 57 the date of James I. is printed 1630.

The volumes present a neat appearance, and the work is one we can most heartily commend.

History and Geography Examination Papers.

Compiled by C. H. Spence, M.A. London: George Bell and Sons.

The notion of duality seems to be a feature of this collection of questions. They relate to two subjects, Geography and History. The questions on each of these subjects are arranged in two main sections, the first consisting of papers of questions, original or selected, on special portions of the subject, and the second including a number of papers set in recent years at the Cambridge Local, London University, Civil Service, Preliminary, Army, and other examinations. The book is intended to be useful to both teachers and students, and for each it has a two-fold object. For both it is calculated to suggest points for special study or instruction; and while it may save the teacher the trouble of making suitable questions to test his pupils, it will provide the student with abundant means of practising for an examination. Most of the questions are such as demand thoughtful treatment as well as knowledge of facts; and, remembering the old dictum that 'a wise question is the half of knowledge,' we cannot doubt that such a well-chosen collection of questions will prove of real value to anyone who makes a reasonable use of it. We append two or three questions as samples to justify our remarks.

'What causes (physical, moral, and political) have led to the prosperity of the United States?'

'Show how position and nature of the soil determines the occupation and population of different districts in the British Isles.'

'Explain how and why the English conquest of Britain differed from the Frankish conquest of Gaul.'

'The influence of the Wars of the Roses on the social and political life of England.'

Lamb's Tales from Shakespeare. Edited by Alfonzo Gardiner. Manchester: John Heywood.

Mr. Gardiner explains his purpose in sending forth this edition of a selection of Lamb's Tales in the following words:—'In preparing this selection of eight of the "Tales" three objects have been kept in view—(*a*) to present to our young people Charles and Mary Lamb's version of what are considered to be Shakespeare's masterpieces; (2) to give such needful explanations as shall make the language and the allusions intelligible to the young readers; (3) and to show the moral lessons that Shakespeare's plays enforce.' The first of these aims has been carried out by printing, almost entirely without alteration, the text of the tales as left by Lamb and his sister; the second, by placing at the foot of the pages notes explanatory of names, allusions, and words now little used; and the third, by a note placed at the end of each tale, embodying the opinions of eminent writers on the mind of Shakespeare. The text is beautifully printed; and the notes, though not numerous, answer their purpose very well. We think, however, that they would have been quite as serviceable at the end of the play, while the uniformity and chasteness of the pages would not have been, as now, interfered with.

The volume is strongly but very neatly bound, and would do service either as a prize, or as a reading book for schools.

Plotting, or Graphic Mathematics. By R. Wormell, D.Sc., M.A. London: Waterlow and Sons.

Dr. Wormell's book is, we believe, a new departure, and it is therefore difficult to adequately estimate its value as an educational instrument, because it has not been tried as such except by the author. Practically, it is an attempt to apply the methods of Froebel to the subject of Analytical Geometry. We will pass its contents shortly in review, as perhaps the best means of showing our readers whether it is likely to suit their purpose. It begins (pp. 3—16) with preparatory exercises, to give facility in the use of ruled, or 'logarithm' paper, showing how this may be used in designing decorative patterns, by filling in the various squares according to some symmetrical system, how plans or drawings may be copied by it to scale, diminished or increased, and how certain simple results in the theory of numbers follow by means of it, such as that the sum of the odd numbers, from unity upwards, always forms a square. The sections here given on triangular, pyramidal, and figurate numbers seem to us altogether out of place. Then we come to the main body of the work. The system of co-ordinates is given for the case when both are positive. We are shown how to find areas, and a glance inside a surveyor's field-book is accorded. Chapter II. shows the application of these methods to proportion—and of course it is here necessary to assume a knowledge of Euclid's Sixth Book. Chapter III. introduces us to the complete system of rectangular co-ordinates, and explains the significance of an equation between them. An equation is known by its fruits, for Dr. Wormell plots out a number of points upon it, and opines by the look of the result that it is a line or circle as the case may be. Chapter IV. introduces us to the paths of moving points and projectiles, leading on in the next chapter to a discussion of the parabola, which is followed by the ellipse and hyberbola, while a few instances of 'Higher Graphs and Curves of Observation' complete the book. We can say more easily perhaps what the book will not serve for than what it will. It will not do as an introduction to Analytical Geometry. It will not do, we think, even for the perusal of any but the science student, whose sole wish in acquiring co-ordinate geometry is to be able to plot out the various pressures of his steam engine,&c.,&c., with a view to finding the curve of pressure. Perhaps it may be useful in such a case as this, but we are inclined to question whether a book need have been devoted to so small an object which an hour's talking by a good teacher might have attained far better. 'Graphic Mathematics' is surely, in any case, a too high-sounding title, inasmuch as it must lead anyone who knows anything about the subject to anticipate some discussion, at all events, of Graphic Statics and other methods, which he will certainly fail to find.

Greek Testament Selections. By A. M. M. Stedman, M.A. London: G. Bell and Sons.

This volume has been prepared, the author tells us in the preface, for use in schools where it is found impossible to read in a term more than a small portion of the Greek Testament.

When the first edition of this useful book was published we ventured to predict that it would be highly appreciated and widely used. Such has been the case. A new edition has been called for, and a much enlarged and improved edition has been issued. There has been added an introduction, notes, and vocabulary. Of course the vocabulary has rendered the book much more handy for a school-boy to use. Nor will those fail to appreciate it who know but little Greek, and yet wish to read the New Testament in the original. The paper, printing, and binding are alike excellent. Now, even more than before, we recommend these Greek Testament selections to the notice of teachers and students. It was a capital idea, and has been most successfully wrought out.

Lessons in Elementary Mechanics. Specially adapted to the requirements of the Revised New Code. Second Stage. By W. H. Grieve, P.S.A. London: Longmans, Green and Co.

Mr. Grieve has modelled his book very strictly and conscientiously upon the lines of the New Code, which, it will be remembered, prescribes for the second stage the following subjects:—Matter in motion; the weight of a body, its inertia and momentum; measures of force, work and energy; energy may be transformed, but cannot be destroyed; heat as a form of energy. On the whole we are able to congratulate our author upon the considerable success attained. The book is well got up, clearly printed, and provided with 121 illustrations, most of which are entirely to the point, though some few seem to have been really intended for the pages of *Funny Folks*, or other such magazine, and to have strayed hither by accident. We think that this last point is decidedly a mistake in books adapted for school use. The risible faculties of schoolboys are near enough to the surface, and the elegant picture of two gentlemen coming incontinently into collision at a corner of a street, while a dog barks briskly at a blank wall, is not unlikely to provoke more merriment than study of the third law of motion, which is darkly hinted at therein. We strongly advise the omission of Fig. 64 (fat boy jumping stream), Fig. 68 (the same, as circus-rider, jumping through a hoop), Fig. 81 (advertisement for Crystal Palace), and several others. Apart from this, we have little but praise. Everyone who has tried the task knows how really difficult it is to render lessons in Elementary Mechanics interesting, and how necessary it is to be provided with a large store of instances and illustrations. Mr. Grieve provides these admirably, and adds to the teacher's indebtedness by putting some 20 questions, mostly well-chosen and to the point, at the end of each of his 17 chapters. The book concludes with some examination papers, and answers are given to those questions which are numerical. Everything, so far as we have noticed, is very accurate. We dislike the definition given of 'force.' It ought to be more clearly stated that force is recognisable as such when it *changes*, as well as when it *produces* or *prevents* the motion of a body. The grammar of the explanations is not always all that can be desired—*e.g.*, on p. 105 we read, 'If the young reader *would* only pursue . . . he *will* there find, &c.'

Arithmetical Exercises and Examination Papers. By H. S. Hall, M.A., and S. R. Knight, B.A. London: Macmillan and Co.

This book can be used separately or with any text book on Arithmetic. It contains eighty progressive exercises, embracing six hundred and forty questions in the higher rules of Arithmetic, followed by fifty of the most recent public examination papers of various kinds, and two hundred miscellaneous examples in Logarithms and Mensuration. A list of formulæ in Mensuration and of numerical constants is also given. The questions are thoroughly practical, and afford ample scope for thought on the part of the pupil. It is just such a book as should be in the hands of a teacher who has the preparation of pupils for many different examinations on his hands, or of an educator who wants to vary the practice provided by an ordinary text book. Pupil teachers would also find it very useful; the last section especially furnishing a capital sequel to the higher rules of Arithmetic.

A Short Text Book on Sound, Light, and Heat. By Thomas Dunman; revised and completed by Chapman Jones, F.I.C., F.C.S., &c. London: Ward Lock and Co.

The chapters that appeared in the *Universal Instructor* upon the subjects of Sound, Light, and Heat, have for the convenience of students been issued separately. The death of the author of these chapters made it necessary for the work to be completed by other hands. No attempt, we learn from the preface, has been made to suit the book to the syllabus of any examining body. It is believed that it will be found a suitable guide for students who are preparing the elementary examinations in physics. The print is rather small, and the diagrams are not of the best, though it is only fair to say that they are abundant and sufficiently clear to illustrate the subject. We believe a very fairly successful attempt has been made to express in a popular style most important facts and principles of the subject. Those who knew the author and heard his lectures will doubtlessly derive great pleasure from this permanent record of his instruction.

Commercial Mathematics: Arithmetic and Algebra. London: Longmans, Green and Co.

This book has been produced for the use of candidates preparing for the new commercial examinations to be held under the Oxford and Cambridge Schools Examination Board. The section on Arithmetic is rather brief, but it includes a fairly full account of the decimal system of France, a chapter on the money, weights, and measures of the most important countries of the Continent, and another on exchange.

Algebra is dealt with at greater length, but is limited to the rules up to involution and evolution, including simultaneous equations and greatest common measure.

The exercises are numerous, and the answers to them are printed at the end of the book.

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Pestalozzi.

BY THE REV. CANON WARBURTON, M.A.,

Formerly Her Majesty's Inspector of Training Colleges for Schoolmistresses.

CHAPTER VI.—*continued.*

With 'Father Pestalozzi,' as with the aged survivor of the twelve Apostles, religion seemed to resolve itself into the single element of love; but, unlike him, Pestalozzi believed in a natural birth-tendency in the child towards what is good and holy, requiring only to be protected in its development from the corrupting influences of the world. Allusion has already been made to his favourite theory that all education is founded on the relationship which subsists between the infant child and the mother. 'The feelings of gratitude, confidence, and love in the child towards the mother,' he tells us, 'gradually unfold themselves, and are at a later period transferred by the child, on the admonition of the mother, to God.' To this Dr. Mayo eloquently adds:—'The great means to be employed in moral development Pestalozzi held to be love. The mother's love draws out the child's love; the mother's care and tenderness awaken the first dawnings of faith; the child feels safe in her arms; he confides in her word; what she says he believes, and her will is the law to which he yields, and which he obeys. Thus it is in the mother's arms that the moral character is first developed, and moral education passes its first stage. Rightly to direct and exercise the nascent faculties and sentiments is the next point, and here, God Himself, our Heavenly Father, as early as possible, must be presented as the first object of love, His superintending Providence as the object of faith, and His will as the rule of life.'* A beautiful, we will not say, an *ideal* picture—for, thank God! the experience of most of us will testify that it can be, and has been, realised; but alas! it presupposes the mother—the average mother, be it remembered—as pure and innocent as the new-born child, enfolding it, like an angel, under her wings, and enshrining it safe, in the sanctuary of an unruffled bosom, from all the coarseness and defilements of the outer world. Pestalozzi, however, always regarded this idea with peculiar affection, as the first and best of his 'discoveries.' He says, 'I should not anticipate half the good results of our system for the benefit of mankind so long as it failed of extending to the earliest stage of education; and, to make it do this, we require the co-operation of the most powerful ally of our cause, so far as human power may contribute to an end which Eternal love and wisdom have designed:—the object of our ardent desires will never be obtained but through the assistance of the mothers.' Upon this passage, a well known English Pestalozzian* observes, 'The estimate which Pestalozzi formed of this "prize," the tenacity with which he held it, and the place which he assigned it in his system ought to be thoroughly realised.' It took that undivided possession of his mind which a familiar thought will sometimes acquire from a novel combination. It inspired him with the most sanguine hopes; it was from that moment the nucleus, the luminous centre of all his efforts, and the foundation of his system of moral influence and moral elevation. But in time Pestalozzi became dissatisfied here, and he then made his final discovery. He would carry the parental feeling into the schoolroom, and convert the schoolroom into a home. He saw that the family was the original school—God's model school in the beginning of the world. The trainers of children, according to the order of nature, are their parents, their brothers and sisters. 'And depend upon it,' he came to assert, 'just so far as we fail to conform the school to a family, in spirit and character, it will be imperfect, it will bear the impress of human, not of divine wisdom?' We are justified then in saying that it was one of the first principles of Pestalozzi's system that all *education must be essentially of a parental character.*

Pestalozzi's Principles.

(2.) Had we been strictly following the order of importance, the foremost place among Pestalozzi's principles should undoubtedly have been assigned to the next axiom, or

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* In the 'Evening Hours of a Hermit' (see page 10), Pestalozzi says, in language of real beauty, though perhaps of questionable orthodoxy: 'Faith in God is the pure sense of simplicity—the ear of Innocence listening to the voice of Nature proclaiming the Fatherhood of God.'

* Mr. Dunning.

'discovery,' as he would perhaps have called it; which, in fact, underlies all the rest, and has done more to revolutionize our modern systems than the whole of them put together;—namely, *All education must be founded upon a knowledge of the nature of the child, and must follow the natural order of the development of the human faculties.*

The artist must be acquainted with the subject-matter of his art, which, in the case of the educator, is the mind of childhood—'the study of the mind itself must form the basis of the science which aims at developing it.' And the true teacher must be not only a mental analyst, but a student of character; for in different individuals tastes and faculties are developed in a different order, and it will be necessary for him to know when to apply to each of them encouragement or guidance, or restraint. The mind is a living organism with laws of its own, for its growth, nutrition and development; its treatment must be in harmony with these laws. The physician has long since discovered that he can only assist the efforts of nature; the cultivator, that he can create nothing in, can add nothing to, the plant, but only contribute to its proper development by protecting the tender germ from all injurious influences, and by supplying it with the nourishment best suited for its growth. So it is with the cultivator of the mind—he works under the same conditions; and therefore, in selecting the proper nutriment for its development he should attach their relative importance to the different subjects of elementary instruction, not so much for their own sake as for the educative power which they severally possess; he should regard the mind of his pupil, not so much in the light of a receptacle for knowledge, as of an instrument which can be made more or less perfect for the acquisition of knowledge for itself.

(To be continued.)

Quarterly Arithmetical Tests.

STANDARD I.—FIRST QUARTER.

1. 43
506
8
71
260

2. 659
654

3. 975
301

4. 2 × 7;
11 × 3;
4 × 10.

SECOND QUARTER.

1. 319
7
893
50
4

2. 413
207

3. 500
40

4. 8 × 6;
3 × 9;
12 × 4.

THIRD QUARTER.

1. 42
908
763
85
437

2. 172
75

3. 804
798

4. 5 × 12;
7 × 4;
6 × 9.

STANDARD II.—FIRST QUARTER.

1. From 30,506 take 9,380.

2. 609 + 5,870 + 29,046 + 7 + 8,312 + 54.

3. Multiply 48,076 × 95.

4. 49d.; 67d.; 82d.

SECOND QUARTER.

1. 53,817 × 370.

2. 19,628 ÷ 4. Write the answer in words.

3. How many boots do 37 boys and 49 girls wear altogether?

4. 71d.; 98d.; 114d.

THIRD QUARTER.

1. 88,080 ÷ 9.

2. 96,570 × 168.

3. I divided fifty-six thousand five hundred and eight marbles equally among a dozen boys; how many did each boy get?

4. 106d.; 123d.; 137d.

STANDARD III.—FIRST QUARTER.

1. 164,115 ÷ 45.

2. 796,058 × 970.

3. How often is 638 contained in six hundred and twenty-five thousand two hundred and forty?

4. A farmer sold 2,330 sheep. He sold 68 to one person, and 58 each to the other persons. How many buyers were there?

SECOND QUARTER.

1. Add together £4,000 10s. 1½d., £539 16s. 7d., 18s. 11¾d., £17 0s. 8½d., £48 15s. 10¼d., £304 13s. 5d., and £7 19s. 9¾d.

2. A train runs 8 hours a day and 35 miles an hour; how far would it run in 1,295 hours?

3. From £307 14s. 6d. take £298 18s. 5¼d.

4. What was gained by buying 27 dozen eggs at 8d. a dozen, and selling them at a penny each?

THIRD QUARTER.

1. Take fifty-nine thousand seven hundred and forty-six pounds fifteen shillings and two pence three farthings from half a million pounds and a farthing.

2. Divide a million by four thousand five hundred and sixty-seven, and prove the sum.

3. Find the sum of seventy-eight thousand and fifty-six pounds eighteen shillings and ten pence, nine pounds nineteen shillings and three pence three farthings, sixteen shillings and eleven pence farthing, three hundred and five thousand and seven pounds thirteen shillings and sixpence three farthings, seventeen shillings and seven pence halfpenny, and ninety thousand six hundred and eighty pounds twelve shillings and eight pence farthing.

4. A boy had two florins and half-a-crown. What had he left after paying for 5 lbs. of sugar at 3d. a pound, and 2 lbs. of butter at 1s. 4d. a pound?

STANDARD IV.—FIRST QUARTER.

1. Multiply fifteen shillings and three farthings by one hundred and seven.

2. £156 17s. 9½d. ÷ 159.

3. What is the cost of 384 articles at £29 14s. $10\frac{1}{4}$d. each?

4. Divide one hundred and forty thousand six hundred and twenty nine pounds ten shillings and two pence halfpenny by six hundred and seventy.

SECOND QUARTER.

1. How much was paid for 13 sheep, each weighing 79 pounds, at $5\frac{3}{4}$d. a pound?

2. Reduce two hundred thousand and thirty seconds to days.

3. If 39 lbs. of butter cost £1 17s. $4\frac{1}{2}$d., what was the cost of a lb.?

4. How many lbs. are there in 29 tons 3 stone 9 lbs. of iron?

THIRD QUARTER.

1. Reduce nineteen thousand and fifty pints to bushels.

2. What is the difference in halfpence between 170 threepenny pieces and 95 sixpences?

3. How many miles could I walk in 7 hours, if I walk 132 yards in a minute?

4. A sofa and half a dozen chairs cost 20 guineas. The sofa cost £4 5s. 6d.; find the cost of each chair.

STANDARD V.—FIRST QUARTER.

1. What will 839 acres cost at £1 16s. $4\frac{1}{2}$d. per acre?

2. Find the cost of 17 sq. yds. 7 ft. 126 in. at half a guinea a square yard.

3. What is the value of 2,345 articles at £2,345 8s. $10\frac{1}{4}$d. each?

4. Find the wages of a housekeeper for 29 weeks 4 days 10 hours at 5s. 3d. per day.

SECOND QUARTER.

1. Make out a bill for the following:—
   11 yards flannel at 1s. $2\frac{3}{4}$d. per yard;
   $17\frac{1}{2}$ yards calico at $9\frac{1}{2}$d. per yard;
   5 pairs of boots at 5s. 9d. per pair;
   3 pairs of kid gloves at 1s. $11\frac{1}{2}$d. per pair;
   $1\frac{1}{2}$ doz. table napkins at 1s. 3d. each.

2. If a ham, weighing 34 lbs., cost £1 1s. 3d., what would it have cost if it had been $5\frac{1}{2}$ lbs. lighter?

3. Bill:—
   350 oranges at 3s. 6d. per hundred;
   $7\frac{1}{2}$ doz. Seville oranges at 2 for $1\frac{1}{2}$d.;
   5 pecks of plums at 1s. $5\frac{1}{2}$d. per gallon;
   9 stone of potatoes at $1\frac{1}{2}$d. per lb.;
   11 lbs. of apples at 2s. 11d. per stone.

4. How many weeks will it take to spend £674 2s. at the rate of £1 15s. 8d. in a fortnight?

THIRD QUARTER.

1. $\frac{3}{5} + \frac{5}{8} + \frac{1}{4}$.

2. If I change 7 to 6 in the fraction one-seventh, how much greater do I make it?

3. If an 18 gallon cask of ale last 19 weeks 1 day, how many pints are consumed in 2 days?

4. If 9 lbs. of rice be worth 7 lbs. of sugar, and the rice was £1 15s. per cwt., what was the price of the sugar per cwt.?

STANDARD VI.—FIRST QUARTER.

1. What fraction with 20 as denominator is equal to $\frac{5\frac{1}{4}}{7}$?

2. $(1{,}900 \times \cdot 54) \div (\frac{1}{4} \text{ of } 1\cdot 216)$.

3. Simplify:— $\frac{1\frac{5}{7} + \frac{3}{8} \text{ of } 2\frac{2}{9}}{2\frac{1}{3} - 1\frac{1}{14} \text{ of } \frac{3}{5}}$.

4. Multiply $\cdot 49\dot{7}$ by $\cdot\dot{6}\dot{3}$.

SECOND QUARTER.

1. The face of a clock is $27\frac{1}{2}$ inches in circumference. What decimal of a mile will the minute hand travel during the month of November?

2. If £$3\frac{1}{2}$ buy $4\frac{2}{3}$ gallons, how much will £$7\frac{1}{4}$ buy?

3. From 2·65 of half-a-crown take 3·875 of a shilling and sixpence.

4. A person had 13 guineas; he gave $\frac{3}{7}$ of the amount to A, $\frac{5}{8}$ of the remainder to B, and the rest to C. What did each receive?

THIRD QUARTER.

1. If $\frac{3}{8}$ of a lb. cost 2s. $9\frac{3}{4}$d., what will $\frac{5}{8}$ cwt. cost?

2. Find the simple interest on £690 for $4\frac{1}{2}$ years at $4\frac{1}{3}$ per cent.

3. What decimal of £4 15s. is $\frac{2}{9}$ of $\frac{3}{5}$ of 1s. 7d.?

4. At what rate per cent. will £90 amount to £139 10s. in $5\frac{1}{2}$ years?

STANDARD VII.—FIRST QUARTER.

1. How many horses are required to plough 75 acres in 9 days, if 6 horses plough 20 acres in 4 days?

2. What is the half year's interest on £49·375 at $4\frac{1}{2}$ per cent.?

3. If the tax on £750 is £16, what is the tax on £487 10s., when the tax is half as much again?

4. Divide £3 11s. 6d. between two men in the proportion of 7 to 6.

SECOND QUARTER.

1. The average rate of mortality of a town for seven years was 439. The death rates for six years were 305, 492, 286, 573, 420, and 637. What was the death rate for the 7th year?

2. If $1\frac{1}{4}$d. is the interest on a crown for 4 months, what is that per cent. per annum?

3. A man travelled $7\frac{1}{2}$ hours at 19 miles an hour, $13\frac{3}{4}$ hours at 16 miles an hour, $9\frac{1}{4}$ hours at 10 miles an hour, and 5 hours at 7 miles an hour. What was his average rate of travelling per hour?

4. Two men with equal incomes live in different towns, and are rated at 3s. 6d. and 2s. 11d. in the pound respectively. One pays £17 4s. 2d. more than the other in rates. What is their income?

THIRD QUARTER.

1. Which is the greater percentage, and by how much, 9 out of 1,000, or 1 out of 99?

2. If I mix 25 lbs. of tea at 3s. per lb. with 18 lbs. at 2s. 6d. per lb., and sell the mixture at 3s. 9d. per lb., what do I gain per cent.?

3. If the length of a room be 19 ft. 9 in., and the area be 31 sq. yds. 7 ft. 54 in., what is the breadth of the room?

4. A woman buys eggs at 7 for 4d., and sells them at 9d. per dozen; find her gain per cent.

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	888.	1,273.	2,235.
2.	5.	206.	97.
3.	674.	460.	6.
4.	14 ; 33 ; 40.	48 ; 27 ; 48.	60 ; 28 ; 54.

STANDARD II.

	FIRST.	SECOND.
1.	21,126.	19,912,290.
2.	43,898	4,907.
3.	4,567,220.	172 boots.
4.	4s. 1d. ; 5s. 7d. ; 6s. 10d.	5s. 11d. ; 8s. 2d. ; 9s. 6d.

THIRD.

1. 9,786 + 6.
2. 16,223,760.
3. 4,709 marbles.
4. 8s. 10d. ; 10s. 3d. ; 11s. 5d.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	3,647.	£4,919 15s. 5¾d.	£440,253 4s. 9½d.
2.	772,176,260.	45,325 miles.	218 + 4,394.
3.	980 times.	£8 16s. 0¾d.	£473,756 18s. 11½d.
4.	40 buyers.	9s.	2s. 7d.

STANDARD IV.

	FIRST.	SECOND.
1.	£80 1s. 8¼d.	£24 12s. 1¼d.
2.	19s. 8¾d. + 41q.	2 days 7 hrs. 33 min. 50 sec.
3.	£11,421 4s.	11½d.
4.	£209 17s. 10¾d.	65, 011 lbs.

THIRD.

1. 297 bus. 2 pks. 1 gal. 1 qt.
2. 120 halfpence.
3. 31½ miles.
4. £2 15s. 9d.

STANDARD V.—FIRST.

1. £1,525 18s. 7½d.
2. £9 7s. 8¼d.
3. £5,500,063 3s. 0¼d.
4. £54 8s. 11¼d.

SECOND.

1. 13s. 6¼d. + 13s. 10¼d. + £1 8s. 9d. + 5s. 10½d. + £1 2s. 6d. = £4 4s. 6d.
2. 17s. 9¾d.
3. 12s. 3d. + 5s. 7½d. + 14s. 7d. + 15s. 9d. + 2s. 3½d = £2 10s. 6d.
4. 756 weeks.

THIRD.

1. $1\frac{19}{40}$.
2. $\frac{1}{42}$.
3. 4½ pints.
4. £2 5s.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	$\frac{15}{28}$.	·3125.	£35.
2.	3,375.	$9\frac{2}{3}$ gallons.	£134 11s.
3.	$1\frac{36}{71}$.	9¾d.	·002.
4.	·3167.	A £5 17s., B £6 10s., C £1 6s.	10 per cent.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	10 horses.	360	1 out of 99 by $\frac{188}{990}$ or ·116 per cent.
2.	£1 2s. 2⅝d.	6¼ per cent.	34⅜ per cent.
3.	£15 12s.	$13\frac{57}{71}$ miles.	14½ feet.
4.	£1 18s. 6d. and £1 13s.	£ 590.	31¼ per cent.

Tests in Mental Arithmetic.

STANDARD I.

1. How many times does a clock strike from 1 to 6? 21.
2. How many are five times five and 4 more? 29.
3. What is the difference between 37 and 53? 16.
4. Find the cost of 16 oranges at two for three halfpence. 1s.
5. How many farthings would that be? 48.
6. If I had a shilling, and bought 4 pounds of rice at 2d a pound, how much should I have left? 4d.
7. How many is a quarter of 100? 25.
8. How many half-pennies are there in 25 pence? 50.
9. How many sixpences could you get for 7 half-crowns? 35.
10. There are 35 buns in a box; how many times could I take out 4 at a time? 8.
11. How many would be left? 3.
12. How many inches are equal to 1½ feet? 18.

STANDARD II.

1. From 8 times 9 take 12. 60.
2. What is the cost of 60 oranges at 3 a penny? 1s. 8d.
3. How many farthings are equal to that amount? 80.
4. I have 3 dozen nuts. How many more do I require to give 7 boys 7 each? 13.
5. Find the cost of 1½ lbs. of butter at 1s. 6d. a lb. 2s. 3d.
6. What change would be received out of a crown? 2s. 9d.
7. How long would this last if I spend 3d. a day? 11 days.
8. How many sixpences are equal to a guinea? 42.
9. Take 4 florins from 2 crowns. How many pence are left? 24.
10. How many sixpences could you get for 4 florins and 2 crowns? 36.
11. How many months are there in five years? 60.
12. Add the first eight digits together, and divide by 12. 3.

STANDARD III.

1. How many shillings are there in 3 guineas? 63.
2. What is the half of 63? 31½.
3. Find the cost of 4 books at 1s. 9d. each. 7s.
4. What change would be received out of 3 half-crowns? 6d.
5. Find the cost of 7 lbs. of sugar at 3½d. per lb. 2s. 0½d.
6. How many farthings are equal to that? 98.
7. What is the cost of 50 penny stamps and 50 half-penny stamps? 6s. 3d.
8. How many inches are there in 1½ yards? 54.
9. How many yards are there in half a mile? 880.
10. Find the cost of 3½ qts. at 3d. a quart. 10½d.
11. How much short of a gallon is that? 1 pint.
12. If I walk 12 miles in 3 hours, how far do I walk in 30 minutes? 2 miles.

STANDARD IV.

1. How many lbs. are there in ¾ cwt.? 84.
2. Find the cost of 84 oranges at 9d. a dozen. 5s. 3d.
3. How many threepences are there in that amount? 21.
4. If eggs are 1½d. each, how many could you get for half-a-crown? 20.
5. What are a week's wages at 5s. a day, reckoning half a day for Saturday? £1 7s. 6d.
6. How long would 3 tons 12 cwt of coal last, if 2 cwt. be used weekly? 36 weeks.
7. How much is that short of a year? 16 weeks.
8. How many lunar months are equal to that? 4.
9. What is two-fifths of a sovereign? 8s.
10. How many lbs. of soap at 4d. a lb. will this buy? 24.
11. How many more lbs. are required to make 3 stone? 18.
12. If 3 lbs. of sugar cost 7d., what would 15 lbs. cost? 2s. 11d.

STANDARD V.

1. If I write a page in 15 minutes, how much could I write in 6 hours? 24 pages.
2. What part of a day is 3 hours? $\frac{1}{8}$.
3. How many sixteenths are required to make this fraction unity? 14.
4. Find the cost of a thousand pencils at twenty a penny. 4s. 2d.
5. If a cwt. cost a sovereign, what will 7 lbs. cost? 1s. 3d.
6. What is the value of 3 dozen eggs at 1s. 3d. a score? 2s. 3d.
7. From square of 13 take square of 12. 25.
8. If 4 yards cost a guinea, what would 9 yards cost? £2 7s. 3d.
9. If 7 men earn £25, how much would 63 men earn? £225.
10. How many eggs could be bought for 4s. 3d. at 16 for a shilling? 68.
11. What dividend will be received on a debt of £475, if the debtor pay 2s. 6d. in the £? £59 7s. 6d.
12. If 25 per cent. were taken off the price of an article marked 5s., how much was paid for it? 3s. 9d.

STANDARDS VI. AND VII.

1. Add together a fifth and half a fifth. $\frac{3}{10}$.
2. Find the sum of $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$. $\frac{3}{4}$.
3. From 80 take 79·956. ·044.
4. What decimal of a yard is 3 inches? ·08$\dot{3}$.
5. Find the value of ·375 of a guinea. 7s. 10½d.
6. Divide ·54 by ·006. 90.
7. What is the amount of £600 for six months at 7 per cent.? £621.
8. I lost 20 per cent. by selling a horse for £40; what did it cost me? £50.
9. Find the interest on £40 for a month at 4 per cent. 2s. 8d.
10. What must I charge for goods costing £30 to gain 12½ per cent.? £33 15s.
11. What is the simple interest on £15 for 2 years at 3½ per cent.? £1 1s.
12. Find the percentage of loss on an article bought for 6s. and sold for 5s. 4d. 11$\frac{1}{9}$ per cent.

Jeanne d'Arc, by Lamartine.

XXIV.

JEANNE D'ARC.	JOAN OF ARC.
Les chefs, pressés de profiter	The chiefs, eager to take advantage
de cet enthousiasme,	of this enthusiasm,
ébranlèrent leurs troupes.	ordered their troops to advance.
Jeanne, consultée par eux,	Joan, (being) consulted by them,
voulait que, sans considération	desired that, without considering
du nombre et de l'assiette des Anglais,	the number and the position of the English,
on marchât droit à Orléans	they should march straight on Orleans
par la route la plus courte,	by the shortest route,
celle de la Beauce.	that through La Beauce.
Les généraux feignirent d'y consentir,	The generals pretended to consent to it,
mais ils la trompèrent	but they deceived her,
pour le salut des troupes	for the safety of the troops,
et lui firent traverser la Loire	and caused her to cross the Loire
pour s'avancer à l'abri du fleuve	so as to advance protected by the river
par les bois et les marais de la Sologne.	through the woods and marshes of La Sologne.
Le chapelain de Jeanne marchait	Joan's chaplain marched
en tête de l'armée,	at the head of the army,
portant sa bannière	carrying her banner
et chantant des hymnes.	and singing hymns.
La marché ressemblait à une procession	The march resembled a (religious) procession
où le prêtre guide les soldats.	in which the priest leads soldiers.
Jeanne arriva le troisième jour	Joan arrived on the third day
en face d'Orléans.	opposite Orleans.
En voyant le fleuve	When she saw the river
entre elle et l'armée,	between her and the army,
elle s'indigna d'avoir été	she was angry at having been
trompée par les généraux.	deceived by the generals.
Elle voulait qu'on attaquât	She wished them to attack
sur l'heure les fortifications	at once the fortifications
des Anglais interposées	of the English placed
entre l'armée et la ville.	between the army and the town.
On endormit son impatience.	They lulled (soothed) her impatience.

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Le lendemain, ayant congédié l'armée	The following day, having dismissed the army
du roi qui n'avait pour mission que	of the King, whose sole duty it was
d'escorter le convoi jusqu'aux portes	to escort the convoy to the gates
et qui devait retourner défendre la plaine,	and to return to defend the plain,
Jeanne entra dans Orléans	Joan entered Orleans
à la tête de deux cents lances seulement;	at the head of 200 lances only;
elle était suivie	she was followed
du brave chevalier Lahire et de Dunois.	by the brave knight Lahire and de Dunois.
Montée sur une haquenée blanche,	Mounted on a white horse,
élevant son étendard	raising her banner
dans la main droite,	in her right hand,
revêtue de sa légère armure	clad in her white armour

qui étincelait aux yeux	which glittered
d'un doux éclat, elle était à la fois,	with a soft brightness, she became at once,
pour les habitants de la ville	for the inhabitants of the town
et pour les soldats, l'ange	and for the soldiers, the angel
de la guerre et de la paix.	of war and of peace.
Les prêtres, le peuple, les femmes,	Priests, people, women,
les enfants, se précipitaient	children, threw themselves
sous les pieds de son cheval	under the feet of her horse
pour toucher seulement ses éperons,	just to touch her spurs,
croyant qu'une vertu divine	believing that a divine virtue
émanait de cette envoyée de Dieu.	emanated from this messenger of the Almighty.
Elle se fit conduire à l'église,	She was conducted to the church,
où l'on chanta un *Te Deum*	where a *Te Deum* was sung,
de reconnaissance pour la ville secourue.	in gratitude for the recovery of the town.
Mais le secours qui réconfortait	But the help which comforted
le plus le peuple était le secours surnaturel	the people the most was the supernatural help
qu'il croyait voir et posséder	which they believed they saw and possessed
dans la prophétesse.	in the prophetess herself.
Jeanne fut conduite de la cathédrale	Joan was led from the cathedral
dans la maison de la femme la mieux famée	to the house of the most respectable woman
de la ville pour que sa vertu fût	in the town, so that her virtue might be
à l'abri des mauvais discours	protected against all slanders,
et que sa bonne renommée restât	and that her good name might remain
intacte au milieu des camps.	unsullied in the midst of camps.
On lui avait préparé un festin.	A feast had been prepared for her.
Mais elle n'accepta qu'un peu	But she only accepted a little
de pain et de vin, en humilité	bread and wine, in her humbleness (of heart)
et en mémoire de la table frugale	and in remembrance of the frugal table
de son père.	of her father.

XXVIII.

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En vain les capitaines fermèrent-ils les portes	In vain did the captains close the gates
pour s'opposer le lendemain à son ardeur.	to resist her impetuosity on the morrow.
Le peuple et les soldats,	The people and soldiers,
fanatisés d'amour et de foi pour elle,	carried away by their love and faith in her,
se levèrent séditieusement contre eux	rose in rebellion against them
et menacèrent les généraux.	and threatened the generals.
Les portes furent enfoncées	The gates were broken open
par la multitude, qui s'élança	by the mob, which rushed
comme un torrent	like a torrent
sur les pas de sa prophétesse.	after (the footsteps of) the prophetess.
Les chefs furent entraînés par les soldats.	The generals were carried away by the soldiers.
Dunois, Gaucourt, Gonthaut, de Raiz,	Dunois, Gaucourt, Gonthaut, de Raiz,
Lahire, Xaintrailles, s'élancèrent à l'assaut	Lahire, Xaintrailles, rushed to the assault
de la principale forteresse	of the chief fortress
qui restait aux Anglais.	which still belonged to the English.
L'armée anglaise, entourée de remparts	The English army, surrounded by ramparts
et de fossés, foudroyait ces masses.	and ditches, overwhelmed these masses.
Les échelles, brisées à coups de hache,	The ladders, broken by blows of the axe,
se renversaient sur les assaillants.	were hurled back on the besiegers.
Le pied des fortifications	The foot of the fortifications
était jonché de morts.	were strewn with the dead.
Le découragement saisissait la multitude ;	Discouragement seized the multitude ;
Jeanne seule s'obstinait à sa foi.	Joan alone clung to her faith.
Elle saisit une échelle,	She seized a ladder,
et, l'appliquant contre le mur du rempart,	and, placing it against the ramparts,
elle y monte la première,	mounted it first,
l'épée dans la main.	sword in hand.
Une flèche lui traverse le cou	An arrow pierced her neck,
vers l'épaule ;	in the region of the shoulder;
elle roule inanimée dans le fossé.	she rolled inanimate into the moat.
Les Anglais, pour qui Jeanne serait une victoire,	The English, to whom (the possession of) Joan would be a victory
sortent des retranchements pour l'enlever.	rush out of their entrenchments to carry her off.
Gamaches la couvre de sa hache	Gamaches protects her with his axe
et de son corps.	and his body.
Les Français reviennent	The French return
à sa voix et la délivrent.	at the sound of his voice and save her.
Elle reprend ses sens	She regains her senses
et voit Gamaches blessé	and sees Gamache wounded
et vainqueur pour elle.	and victorious on her behalf.
'Ah ! dit-elle en se repentant	'Ah !' she exclaimed, repenting
de l'avoir une fois contristé,	of having once grieved him,
prenez mon cheval, et sans rancune !	'accept my horse, and without any ill-feeling !
j'avais tort de mal penser de vous,	I was wrong in thinking evil of you,
car jamais je ne vis	for never did I see
un plus généreux chevalier.	a more generous knight.'
On emporta Jeanne à l'abri,	They carried Joan away to a place of safety,
pour la désarmer	to take off her armour
et pour visiter sa blessure.	and examine her wound.
La flèche sortait de deux largeurs de main	The arrow stuck out two handbreadths
derrière l'épaule.	behind the shoulder.
Le sang l'inondait.	She was bathed in blood.
Elle était femme et faible pourtant,	She was however only a weak, feeble woman,
car elle pleura	for she wept
en voyant son sang couler.	when she saw her blood flowing.
Puis elle se reconsola,	Then she took comfort,
en priant	as she prayed to
ses célestes protectrices dans le ciel.	her heavenly protectors.
Elle arracha ensuite la flèche	She plucked out the arrow
de sa propre main,	with her own hand,
et répondit aux hommes d'armes	and replied to the men at arms
qui lui recommandaient	who recommended to her
des remèdes superstitieux d'enchanteurs	the superstitious remedies of magicians
et des paroles magiques	and magic words
en usage alors dans les camps :	used at that time in the camps :
'J'aimerais mieux mourir	'I should prefer to die
que de pécher ainsi	rather than sin thus

contre la volonté de Dieu.'	against God's will.'
On pansa sa blessure avec de l'huile,	They dressed her wound with oil,
et elle remonta à cheval	and she remounted her horse
pour suivre à regret l'armée	to follow with regret the army
et le peuple découragés,	and the discouraged people,
qui se retiraient.	who retreated.

XXIX.

Elle entra, pour prier, dans une grange.	She entered a barn in order to pray.
Le cœur lui disait encore de combattre,	Her heart still counselled her to fight,
mais elle n'osait tenter Dieu	but she dared not tempt God
et résister à l'avis des capitaines.	and resist the advice of her captains.
Cependant sa bannière	However, her banner
était restée dans le fossé,	still remained in the moat,
au pied de l'échelle d'où	at the foot of the ladder from which
Jeanne venait d'être renversée.	Joan had just been hurled.
Daulon, son chevalier,	Daulon, her squire,
s'en étant aperçu,	having perceived this,
courut avec quelques hommes d'armes	rushed with a few men at arms
pour reprendre cette dépouille,	to recover this trophy (spoil),
qui aurait trop enorgueilli les Anglais.	which would have made the English too proud.
Jeanne y courut à cheval après eux.	Joan galloped after them.
Au moment où Daulon remettait	At the moment when Daulon put
dans les mains de sa maîtresse l'étendard,	into the hands of his mistress (Joan) the standard,
ses plis, agités par le mouvement	its folds, shaken out by the movements
du cheval et par le vent,	of the horse and wind,
se déroulèrent au soleil	were unfurled to the sun (breeze)
et parurent aux Français un signal	and seemed to the French a signal
que Jeanne leur faisait	which Joan gave them
pour les rappeler à son secours.	to call them back to her aid.
Les Français, déjà en retraite,	The French, already in retreat,
accoururent de nouveau	rushed back once more
pour sauver leur héroïne.	to save their heroine.
Les Anglais qui la croyaient morte,	The English who believed her dead,
la revoyant à cheval	seeing her again on horseback
à la tête des assaillants,	at the head of the besiegers,
la crurent ressuscitée ou invulnérable :	thought she had come to life again, or invulnerable:
la panique s'empara d'eux.	a panic seized them.
Les illusions du feu des canons	The illusions of the firing of the cannons
au milieu des fumées colorées	amidst the coloured smoke
de la poudre leur firent voir	of the gunpowder made them see
des esprits célestes,	celestial spirits,
divinités tutélaires d'Orléans,	the tutelary divinities of Orleans,
à cheval dans les nuées,	riding in the clouds,
et combattant de l'épée de Dieu	and fighting with the sword of the Almighty
pour Jeanne et sa cause.	for Joan and her cause.
Une poutre, jetée sur le fossé,	A beam, thrown across the moat,
servit de pont-levis à un intrépide chevalier	served as a drawbridge to an intrepid knight
qui fraya le chemin des remparts	who cleared the road to the ramparts
à nos bataillons.	for our battalions.
Le commandant anglais, Gladesdale,	The English commander, Gladesdale,
se repliant devant cette irruption,	falling back before this irruption (attack),
cherchait à traverser un second fossé	sought to cross a second moat
pour s'enfermer dans le réduit.	to shut himself up in the inner fort.
'Rends-toi, Gladesdale ! lui cria Jeanne.	'Surrender, Gladesdale !' cried Joan.
Tu m'as vilainement injuriée,	'Thou hast insulted me shamefully,
mais j'ai pitié de ton âme	but I have pity on thy soul,
et de celle des tiens.'	and on those of thy people.'

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XXXI.

Mais Jeanne ne perdit pas de temps	But Joan did not lose time
à savourer de vains triomphes.	in enjoying empty triumphs.
Elle ramena l'armée victorieuse	She led back the victorious army
au Dauphin, pour l'aider	to the Dauphin, to help him
à reconquérir ville à ville son empire.	to reconquer every town of his kingdom.
Le Dauphin et les reines la reçurent	The Dauphin and the Queens received her
comme une envoyée de Dieu,	as one sent from God,
qui leur apportait les clefs perdues	who brought to them the keys (hitherto) lost,
et retrouvées de leur royaume.	but now found again, of their kingdom.
'Je n'ai qu'un an à durer,	'I have only one year to live,'
dit-elle avec une prescience triste	she said, with melancholy prescience
qui semblait lui révéler son échafaud	which seemed to unveil to her the scaffold
dans sa victoire ;	in the midst of her victories ;
il me faut donc vite employer.'	'you must therefore let me do my work quickly.'
Elle conjura le Dauphin d'aller	She besought the Dauphin to go
se faire couronner immédiatement à Reims,	to be crowned immediately at Rheims,
bien que cette ville	although this town
et les provinces intermédiaires fussent	and the intervening provinces were
encore au pouvoir des Bourguignons,	still in the power of the Burgundians,
des Flamands et des Anglais.	Flemish and English.
L'imprudence de ce conseil	The imprudence of this advice
frappait les conseillers et les généraux de la cour.	deeply impressed the councillors and generals of the court.
Le sacre du roi à Reims était,	The coronation of the king at Rheims was,
aux yeux de tous,	in the eyes of everyone,
une impossibilité ou une témérité	an impossibility or an act of rashness
qui pour une vaine ombre de puissance,	which, for the vain semblance of power,
leur ferait abandonner les fruits	would cause them to give up the fruits
de la victoire actuellement dans leurs mains.	of the victory now in their grasp.
On voulait reconquérir auparavant	They wished first to conquer
la Normandie et la capitale.	Normandy and the capital.
Les conseils succédaient aux conseils.	Councils succeeded councils.

Jeanne se consumait d'ennui	Joan was consumed with ennui
et d'inaction à la cour ;	and want of action at the court ;
ses inspirations l'obsédaient,	her inspirations beset her,
et à son tour elle obsédait humblement	and in her turn she humbly beset (importuned)
le Dauphin.	the Dauphin.

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XXXIV.

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Après une semaine d'inutile attente,	After a week of useless waiting,
Jeanne fit donner l'assaut aux remparts,	Joan ordered an assault on the ramparts,
du sommet de cette petite colline	from the top of that small hill
couverte aujourd'hui de rues,	now covered with streets,
d'édifices et de temples,	edifices and temples,
qui a gardé le nom	which has still preserved the name
de butte des Moulins.	of 'butte des moulins' (= windmill-hill).
Elle franchit, avec le duc d'Alençon	She cleared, with the Duke d'Alençon
et les généraux, le premier fossé	and the generals, the first trench
sous le feu de la ville.	under the fire of the town.
Parvenue au bord du second et exposée	Arrived at the edge of the second and exposed
presque seule aux traits des remparts,	almost alone to the arrows of the ramparts,
elle sondait la profondeur de l'eau	she sounded the depth of the water
et la vase du bout de sa lance	and the mud with the end of her lance,
et faisait combler le fossé	and had the trench filled up
de fascines par les soldats,	with fascines by the soldiers,
tout en agitant sa bannière	all the while waving her banner
et en criant à la ville rebelle de se rendre,	and calling to the rebel town to surrender,
quand une flèche lui traversa la jambe	when an arrow pierced her leg
et la jeta évanouie	and stretched her fainting
sur un monceau de morts et de blessés.	on a pile (heap) of dead and wounded.
On la transporta	They carried her
sur le revers de la berge du fossé	to the other side of the bank of the moat
où les flèches et les feux	where the arrows and shots
passaient par-dessus sa tête,	passed over her head,
et on l'étendit sur l'herbe	and they laid her down on the grass
pour arracher la flèche de sa blessure.	to draw the arrow out of the wound.
Elle retrouva la voix et les gestes	She recovered her voice and her gestures
pour encourager les siens à l'assaut.	to encourage her people to the assault.
Les vaillants chevaliers la suppliaient	Valiant knights entreated her
en vain de se laisser rapporter au camp,	in vain to allow herself to be carried to the camp,
les flèches et les boulets labouraient	the arrows and cannon balls ploughed up
en vain la terre autour d'elle,	in vain the ground near her,
les fossés se comblaient	the trenches were heaped up
en vain de cadavres :	in vain with corpses :
elle s'obstinait à la victoire ou à la mort.	she persisted in victory or death.

(To be continued.)

The Glass of Water ; or, Cause and Effect.

(Comedy in Five Acts.)

LE VERRE D'EAU ; OU, LES EFFETS ET LES CAUSES.

(Comédie en Cinq Actes.)

Scène V.	Scene V.
Abigaïl, Bolingbroke.	Abigail, Bolingbroke.

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Bolingbroke.

[*lui montrant la porte du fond qui s'ouvre.*	[*Showing her the door in the background opening.*
Avec mes honorables collègues que voici !...	Together with my honourable colleagues whom you see here—
les principaux membres de l'opposition.	the chief members of the Opposition.

Abigail.

Et pourquoi donc ?	And why I ask ?

Bolingbroke.

[*à demi-voix.*	[*lowering his voice.*
Outre l'héritage,	Besides the inheritance,
mon cousin laisse encore des espérances...	my brother leaves also hopes
celles d'une émeute dont sa mort sera peut-être la cause :	of a commotion, of which his death will be perhaps the cause.
c'est le premier service qu'il rend à notre parti...	It is the first service which he has rendered our party,
et jamais, à coup sûr,	and never, most assuredly,
il n'aura fait autant de bruit de son vivant.	will he have made so much stir in his lifetime.
Silence !...c'est la reine.	Hush ! the Queen.

Scène VI.	Scene VI.
Abigaïl, Bolingbroke, la Duchesse, la Reine.	Abigail, Bolingbroke, the Duchess, the Queen.

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Bolingbroke.

Je ne doute point de leur réponse !...	I have no doubt as to their replies—
les places honorables qu'ils occupent	the honourable positions which they occupy
en sont un sûr garant.	are a sure guarantee for that.
Mais enfin ... si, comme madame la duchesse le prétend,	But if, as the Duchess pretends,
le véritable coupable est échappé,	the real culprit has escaped,
sans qu'on l'aperçût,	without it being noticed,
ce qui supposerait une grande connaisance	(a fact) which would imply an intimate acquaintance
des appartements et détours du palais,	with the apartments and windings of the palace,
comment se fait-il	how does it happen
qu'on n'ait pris aucune mesure	that they have not taken any measures
pour le découvrir ?	to discover the culprit ?

Abigail.

[*à part.*	[*aside.*
C'est fait de nous.	It is all over with us.

Bolingbroke.

Comment se fait-il que nous soyons obligés	How does it happen that we are compelled
de stimuler le zèle, d'ordinaire si actif,	to stimulate the zeal, usually so active,
de madame la surintendante, qui, par sa charge,	of your Majesty's superintendent, who, from her office,
a l'entière surveillance et la haute main	has the whole management and full authority
dans la maison de la reine...	in the Queen's household?
comment les ordres les plus sévères ne sont-ils pas déjà donnés ?...	Why have not the most stringent orders been already issued ?

The Duchess.

Ils le sont !	They are.

Abigail.

[*à part.*	[*aside.*
O ciel !	O heaven !

The Duchess.

Sa Majesté vient de prescrire	Her Majesty has just prescribed
les mesures les plus rigoureuses dans cette ordonnance...	the most vigorous measures in this order.

The Queen.

Dont nous confions l'exécution à madame la duchesse	Whose execution we confide to the Duchess
(*la remettant à Bolingbroke*),	(*handing the ordinance to Bolingbroke*)
et à vous, monsieur de Saint-Jean...	and to you, Monsieur de St. Jean,
je veux dire milord Bolingbroke, à qui ce titre,	I mean my Lord Bolingbroke, on whom this title,
et les liens du sang	and the bonds of relationship
qui vous unissaient au défunt,	which united you to the defunct,
imposent plus qu'à tout autre le devoir	impose more than on any other the duty
de poursuivre et de punir le coupable.	of pursuing and punishing the guilty one.

The Duchess.

On ne dira plus, je l'espère,	People will no longer say, I hope,
que nous le protégeons	that we shelter
et que nous voulons le soustraire à votre vengeance.	and desire to protect him against your vengeance.

The Queen.

Milord et messieurs, êtes-vous satisfaits ?	My lord and gentlemen, are you satisfied ?

Bolingbroke.

Toujours, quand on a vu Votre Majesté	Always, after beholding
et qu'on a pu s'en faire entendre.	and when able to approach your Majesty.
(*La reine salue de la main Bolingbroke et ses collègues*	(*The Queen salutes Bolingbroke and his colleagues with her hand;*
qui s'inclinent profondément,	*they bow profoundly.*
et rentre avec la duchesse et ses femmes dans ses appartements à droite.	*Exeunt the Queen, Duchess and Ladies on the right.*
Le reste de la foule s'écoule	*The rest of the crowd disperse*
par les portes du fond.)	*through the doors in the background.*)

Scène VII.	Scene VII.
Bolingbroke, Abigaïl.	Bolingbroke, Abigail.

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Bolingbroke.

[*poussant un cri.*	[*uttering an exelamation.*
J'y suis !...	I know,
l'homme à la chiquenaude ...	the man that snapped his fingers.
Oui, ma chère, une véritable chiquenaude...	Yes, my dear, a real fillip.
c'est elle qui a été la cause de tout,	That snap has been the cause of everything,
d'un duel, d'une émeute...	of a duel, a disturbance,
du superbe discours que je viens de prononcer...	the superb discourse that I have just pronounced,
et plus encore d'une ordonnance royale.	and more than all a royal command.

Abigail.

Qui vous prescrit de l'arrêter.	Which orders you to arrest him.

Bolingbroke.

[*vivement.*	[*quickly.*
L'arrêter !...Allons donc !	Arrest him ! Nonsense !
Celui à qui je dois tout, un rang, un titre	(Arrest) him to whom I owe everything, rank, title,
et des millions ! non...non...	and millions ! No, no,
je ne suis pas assez ingrat,	I am not so ungrateful,
assez grand seigneur pour cela.	not great lord enough to do that.
(*Prenant l'ordonnance qu'il veut déchirer.*)	(*Taking the order which he intends to tear to pieces.*)
Et plutôt morbleu !...(*S'arrêtant.*) O ciel !...	Rather — zounds ! (*Stopping.*) Heaven
et tout un parti qui compte sur moi...	and our whole party count on me,
et l'opposition entière que j'ai déchaînée	the entire Opposition that I have unchained
contre ce malheureux duel...	against this unhappy duel,
et puis enfin aux yeux de tous...	and then again, in the eyes of all,
c'est mon parent...c'est mon cousin...	he is my relative, my cousin.

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Scène X.	Scene X.
Bolingbroke, la Duchesse.	Bolingbroke, the Duchess.

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Bolingbroke.

Je ne vois pas cela !...	I do not see that.
Je connais de hautes capacités politiques	I know some (men of) high political capacities
qui mènent de front les amours et les affaires...	which carry on at the same time love affairs
qui se délassent des préoccupations sérieuses	and state business; who find relief from serious business
par de plus douces pensées	in sweeter thoughts ;
et sortent parfois des détours de la diplomatie	and quit sometimes the tortuous paths of diplomacy
pour entrer dans de piquantes et mystérieuses intrigues.	to enter upon (enjoy) more lively and mysterious intrigues.
Je connais entr'autres une grande dame,	I know a great lady, among others,
que vous connaissez aussi, qui,	whom you also know, who,
charmée de la jeunesse et de la naïveté	charmed with the youth and innocence
d'un petit gentilhomme de province,	of a young nobleman from the provinces,

a trouvé bizarre et amusant	has found it whimsical and amusing
(je ne lui suppose pas d'autre intention)	(I do not attribute to her any other intention)
de devenir sa protectrice invisible...	to become his invisible protectress,
sa providence terrestre,	his earthly providence;
et sans jamais se nommer,	and without ever naming herself,
sans apparaître à ses yeux,	without appearing in his sight,
elle s'est chargée de son avancement et de sa fortune...	she has taken upon herself the care of his advancement and fortune.
(*Geste de la duchesse.*) C'est intéressant,	(*The Duchess slightly starts*) It is interesting,
n'est-ce pas, madame?...Eh bien!	is it not, Duchess? Well,
ce n'est rien encore! Dernièrement,	that is nothing yet! Lately,
et par son mari qui est un grand général,	and through her husband who is a great General,
elle a fait nommer son protégé	she has caused her protégé
officier dans les gardes,	to be appointed an officer in the Guards,
et, ce matin même, l'a prévenu	and, this very morning, has informed him
mystérieusement de son nouveau grade,	mysteriously of his new rank
en lui en envoyant les insignes...	by sending him the insignia of it—
des ferrets en diamants que l'on dit magnifiques...	diamond tags which are said to be magnificent.

The Duchess.

[*avec embarras.*	[*embarrassed.*
Ce n'est guère vraisemblable...	That is scarcely probable,
et à moins que vous ne soyez bien sûr...	and unless you are very certain—

Bolingbroke.

Les voici...ainsi que la lettre qui les accompagnait.	Behold them, as well as the letter which accompanied them.
(*A demi-voix.*) Vous comprenez qu'à nous deux...	(*Changing his tone.*) You understand that between us—
car nous deux seulement connaissons ce secret,	for we two alone know this secret—
nous pourrions perdre cette grande dame!	we could ruin this great lady!
Des places ainsi données sont sujettes	Places thus given are subject
aux contrôles des chambres et de l'opposition...	to the control of both Houses and of the Opposition.
Vous me direz qu'il faut des preuves...	You will tell me that proofs are necessary;
mais ce riche présent acheté par elle...	but this rich present bought by her,
cette lettre, l'écriture qui, quoique déguisée,	this letter, the writing of which, though disguised,
pourrait aisément être reconnue,	might easily be recognised,
tout cela donnerait lieu	all this would give rise
à une effroyable publicité	to terrible publicity
que cette grande dame pourrait peut-être braver:	which this great lady might perhaps face;
mais elle a un mari...	but she has a husband-
ce général dont je parlais...	the General of whom I spoke—
un caractère violent et emporté,	a violent and hasty tempered man,
dont un pareil scandale exciterait la fureur...	whose fury such a scandal would rouse,
car un grand homme, un héros tel que lui,	for a great man, a hero such as he is,
devait penser que les lauriers	must think that laurels
préservaient de la foudre...	preserved from the thunderbolt—

* * * * * * *

ACT III.

Scène II.	Scene II.
La Duchesse, la Reine, Abigaïl.	The Duchess, the Queen, Abigail.

* * * * * * *

The Duchess.

A la bonne heure!	I am glad of your determination.
Je vais annoncer au maréchal ce qui se passe,	I now go to inform the Marshal what is taking place,
et en même temps écrire,	and at the same time write,
pour le marquis de Torcy,	for the Marquis of Torcy,
cette lettre que je soumettrai à l'approbation	that letter which I will submit to you for your approbation
et à la signature de Votre Majesté...	and signature of your Majesty.

The Queen.

C'est bien!	That is well!

The Duchess.

Ici...à trois heures,	Here, at three o'clock,
en venant la prendre pour aller à la chapelle!	on coming to join your Majesty when going to chapel.

The Queen.

A merveille...je vous remercie!...	Very well; I thank you.

The Duchess.

[*à part.*	[*aside.*
Enfin! [*Elle sort.*	At last! [*Exit.*

Abigail.

(*qui pendant ce temps est toujours restée assise près du guéridon.*)	(*who during this time was seated near the table.*)
Pauvre marquis de Torcy... nous voilà bien!	Poor Marquis de Torcy! there we are in a fine predicament.
(*Elle se lève et va replacer près de la porte du fond le tabouret qu'elle y avait pris.*)	(*She rises and is going to put back near the door in the background the seat which she had taken there.*)

The Queen.

(*à gauche et prenant les dépêches que la duchesse lui a remises.*)	(*on the left, taking the despatches which the Duchess had given her.*)
Ah! quel ennui!	Oh! what trouble (ennui)!
Entendrai-je donc toujours parler de bill,	Must I then always hear nothing else spoken of but bills,
de parlement, de discussions politiques?...	parliament, political discussions?
et ces dépêches du maréchal...	and these despatches of the Marshal
qu'il me faut lire, comme si je comprenais	which I must read, as if I understood
quelque chose à ces termes de guerre!	anything of these expressions of war!
(*Elle parcourt le rapport.*)	(*She hastily glances at the report.*)

Scène V.	Scene V.
La Reine, Abigaïl, Bolingbroke, Masham.	The Queen, Abigail, Bolingbroke, Masham.

The Queen.

Ah ! c'est toi, Abïgail...	Oh, it's you, Abigail ?
plus tard je te parlerai.	I will speak with you by-and-bye.

Abigail.

Eh ! non, madame, c'est sur-le-champ !	Oh no, your Majesty, it must be at once.
Un ami qui vous est dévoué...	A friend who is devoted to you
et qui me demande avec instance	entreats me
de la faire arriver jusqu'à Votre Majesté !	to bring him into the presence of your Majesty.

The Queen.

[*avec humeur.*	[*testily.*
Toujours interrompue et dérangée...	Always interrupted and troubled !
pas un instant pour s'occuper d'affaires sérieuses !...	Not a moment to spare for serious business !
Que me veut-on ?...quelle est cette personne ?	What do theywant with me ? Who is this person ?

Abigail.

Lord Bolingbroke.	Lord Bolingbroke.

The Queen.

[*avec effroi et se levant.*	[*rising up in fear.*
Bolingbroke !	Bolingbroke !

Abigail.

Il s'agit, dit-il,	He says it is about
de la question la plus grave, la plus importante !	the gravest and most important matters.

The Queen.

[*à part, avec impatience.*	[*aside, impatiently.*
Encore des réclamations,	Claims again,
des plaintes, des discussions...	complaints, discussions.
(*Haut.*) C'est impossible... la duchesse va venir.	(*Aloud.*) Impossible ; the Duchess is coming.

Abigail.

Eh bien ! avant qu'elle revienne !	Yes, but before she returns !

The Queen.

Je t'ai dit que je ne voulais plus être tourmentée,	I have told you I would not be tormented any longer,
ni entendre parler d'affaires d'État...	nor listen to affairs of the State.
D'ailleurs maintenant cette entrevue ne servirait à rien !	Besides now this interview will be of no use.

Abigail.

Alors, voyez-le toujours,	Then see him all the same,
ne fût-ce que pour le congédier...	were it only to dismiss him,
car j'ai dit qu'on le laissât monter.	for I have told them to admit him.

The Queen.

Et la duchesse que j'attends	And (what about) the Duchess whom I await
et qui va se rencontrer avec lui ?...	and who will meet him here?
Qu'avez-vous fait ?	What have you done ?

Abigail.

Punissez-moi, madame, car le voici !	Punish me, madam, for he is here !

The Queen.

[*avec colère en traversant le théâtre.*	[*crossing the stage in anger.*
Laissez-nous !	Leave us !

Abigail.

[*à Bolingbroke qu'elle rencontre au fond du théâtre et à voix basse.*	[*in a low voice to Bolingbroke whom she meets in the background.*
Elle est mal disposée !	She is ill-disposed (towards you).

Masham.

[*de même.*	[*in a low voice.*
Et vous n'y pourrez rien !	And you will be able to do nothing here.

Bolingbroke.

Qui sait ?...le talent...ou le hasard !...	Who knows ? tact, chance,
celui-là surtout !...	the former especially.
[*Abigaïl et Masham sortent.*	[*Exeunt Abigail and Masham.*

(To be continued.)

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music.

90. *Fe* is best taught by pattern from **soh**. The explanation of the fact that it is a convenient way of naming the **te** of brief changes of key can be left until the class is sufficiently familiar with the effect. But the likeness of **s fe s** to **d** t_1 **d** should be immediately pointed out. When the phrase **s fe s** is easily imitated it should be at once contrasted with **s f m** and attention should be drawn to the fact that **f** sounds graver than ever after the ear is filled with the bright cheerful effect of **fe**. The class should now try to sing **s f m** after the teacher sings **s fe s**, or **s fe s** after the teacher sings **s f m**. Then individuals should be asked to sing **s fe s** and **s f m** alternately, and ear exercises on the two little phrases should follow. Next the class should be asked to sing **s fe s** after any other group of scale tones the teacher may sing, thus :—

Teacher sings.	Children respond.
d s m f m	**s fe s**
d m s l s	**s fe s**
d' s l f m	**s fe s**
m r d f m	**s fe s**

The class will now be able to follow on the modulator such voluntaries as the following :—

Specimen Exercises on **fe**.

In low or medium keys.

(1) **d s m d s l s s fe s s f m r d**
(2) **d m r d s f m s fe s l s f f m**
(3) **s m d r m f s m s fe s f m r r d**
(4) **m r d s d' t l s s fe s l s f r d**
(5) **d r m d s f l s s fe s f m r d**
(6) **m s d r m s fe s l s f m f r d.**

More difficult exercises should be left until a later stage.

91. *Ta* should be introduced much in the same way as **fe**. It should be patterned in the phrase **d' ta l**, the grave '**fah**' like effect of the **ta** pointed out, and the likeness of the phrase to **s f m** of another key shown. When the phrase can be imitated it should be immediately contrasted with **l t d'** and the additional brightness that **t** gains by comparison with **ta** should be forcibly illustrated. Then the class should sing **d' ta l** after the teacher sings **l t d'**, and *vice versa*, and individuals should also in turn sing the same phrases alternately. It will be found much more difficult to establish **d' ta l** in the ear than **s fe s**. The lesson on **d' ta l** will have to be repeated many times before the attack will be firm and sure. Such modulator exercises as the following will perhaps now be practicable. If a mistake is made the teacher should pattern the correction *to* the class and not sing with the pupils.

Specimen Exercises on **ta**.

In a low key.

(1) **d s f m s d' d' ta l l t d' d m r d**
(2) **m d s m d' ta l t d' s m d r m d**
(3) **d r m s d' ta l t d' s f l s m r m d**
(4) **d d' t d' d' ta l l s l t d' m r d**
(5) **s m s d' t d' ta l s l t d' d s t, d**
(6) **m r d m s l t d' d' ta l t d' s d**

Nos. 4 and 5 introduce **s** after **d' ta l**. This succession will require a pattern and special practice. For the present it would be unwise to practice *leaps* to or from **ta** or any succession that does not introduce **t** soon after **ta**.

92. When practising in keys above E or F the **ta** just below **d'** is too high for average voices. The **ta** below middle **d** (**ta,**) should therefore be practised. Although the mental effect of low **ta** is but as it were a deeper shade of the same colour as the **ta** above, it will be found necessary to go through all the processes of patterning and contrasting described above. No practice of **tá** at this stage should be reckoned complete unless the **ta** below **d** is included.

Specimen Exercises on low **ta** (**ta,**).

Key F or G.

(1) **d r m d t, d d ta, l, t, d**
(2) **d m r d d ta, l, t, d r d**
(3) **d s, l, s, t, d ta, l, t, d s, l, t, d**
(4) **d m d s, d ta, l, l, s, l, t, d t, r d**
(5) **m r d s, d t, d l, l, t, d d ta, l, t, d**
(6) **d s, d r d ta, ta, l, t, d r t, d s, t, d**

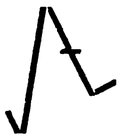
93. The requirements now for the first time ask for proof of power to sing from a written or printed tune exercise. But the previous teaching in other standards must have been miserably inadequate if horizontal exercises in tune are new to the standards in Division III. In this Division the teacher should have only to revise and perfect previous practice of such work. For the purpose of accustoming the eye to the horizontal notation, the modulator may be written on the board, thus :—

d' r' m' f'
d r m f s l t
m, f, s, l, t,

the three different levels showing three octaves and drawing forcible attention to the octave marks. By pointing voluntaries upon this form of modulator the rise and fall of the tones can be grasped without much effort. Another exercise that promotes observation is to get pupils to *draw* the shape of a phrase by curves or oblique lines. Thus :—

d t, l s r m

might be roughly shown by—



Again to enforce attention to octave marks pupils should point on the modulator phrases like the following, which should be written on the blackboard.

(1) **d l m d' t, l s, m**
(2) **s r' d t, m' f s, d'**

94. It will have been observed that the terms of the printed test are the same as those of the modulator test for Division II. That is, any leap in the Doh chord may be used, and the other tones are to be approached and quitted stepwise. The tests given in section 35 will consequently suffice. The twelve tests there given can be made into twelve fresh tests by performing them backwards.

DIVISION III.—STANDARDS III. AND IV.

Code Requirement.

Time Test.—To sing on one sound to the syllable '*laa*' an exercise in three-pulse or four-pulse measure, containing one-pulse notes, half-pulse notes, and whole pulse rests on the non-accented pulses of the measure.

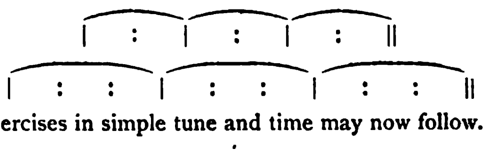
Examples :—

```
|l  :l  |l  :l  |l  :l.l|l  :l  |l  :l  |l  :  }
|l  :   |l  :   |l  :l.l|l  :l  |l  :   |l  :l  }
|l  :—  |—  :—  ||

||l  :—  :l  |l  :l  :l  |l  :l.l:l  |l  :—  :—  }
|l   :   :   |l  :   :l  |l  :   :l  |l  :—  :—  ||
```

95. Four-pulse measure and half-pulse notes have already been dealt with in sections 47 and 53 to 58. The teaching of three-pulse measure and of whole pulse rests has yet to be described.

96. Three-pulse measure is easily taught by contrast with two-pulse measure, say in the following manner. The teacher taps several two-pulse measures (strong, weak, etc.). He then asks the class to listen whether he does the same again or something different. To sharpen curiosity, he taps the same measure again and again, and at last he taps strong, weak, weak, and invites a description of the difference. He then asks pupils to clap in sets of twos or threes until they can do so quite easily. Then with his voice he *laas* now one measure and now the other, and gets the class to do the same. The notation may now be taught, and the term 'three-pulse measure' made familiar. To train the eye to tell the measures from one another, the teacher should write a number of 'skeleton' measures on the board, and get pupils to come forward to draw curves from and to strong accent marks, and to name the measure thus shown—



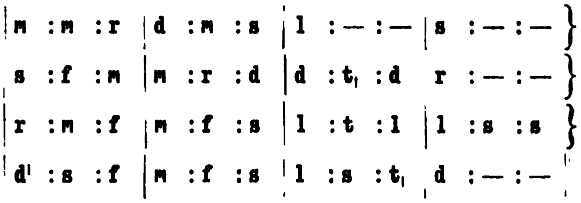
Exercises in simple tune and time may now follow.

Specimen Easy Exercises written in Three-pulse Measure.

(1) Doh is D.

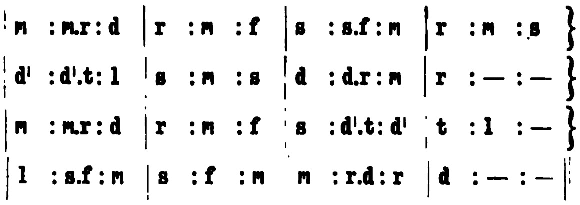
```
|d  :d  :r  |m  :—  :—  |m  :m  :f  |s  :—  :—  }
|s  :s  :f  |m  :s  :d' |t  :l  :t  |d' :—  :—  ||
```

(2) Doh is D or E.



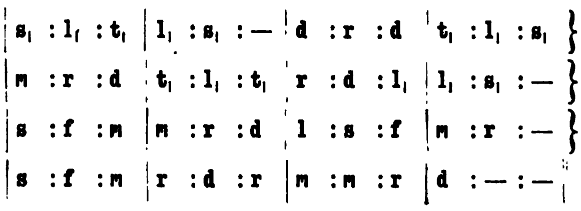
With half pulses.

(3) Doh is D.



Range s_1 to l.

(4) Doh is F.



Some of the leaps in the above are beyond the 'written or printed' *sight singing* requirements of the Code for this Division. But these exercises are studies, not sight singing tests.

(To be continued.)

Our Certificate Class.

BY DR. GEORGE BEACH, M.A.

Head Master of Christ Church School, Macclesfield.

MUSIC.

A paper on this subject is not given to any *Student* about to leave the Training College, who has not passed the Musical Inspector's examination in practical skill. *Acting-Teachers* who take this paper must produce a certificate from some competent person (such as the organist of their church) that they have such an amount of musical skill, vocal or instrumental, as is sufficient for the purpose of teaching children to sing from notes.

The candidate has the option of the Staff or Tonic sol-fa Notation, but must not answer questions in both. A choice of nine questions out of twelve has been afforded for the last ten years, and the paper is distinctly the easiest of the series.

With respect to the merits of the rival notations, much unnecessary controversy has taken place. The T. S.-F. has the great advantage (at any rate in its initial stages) of simplicity. Its modulator depicts more graphically the varying distances between the different notes. It demonstrates very lucidly the tetrachords, and key and mode relationship. It pictorially represents time and accent, and gives a general formula of any musical passages expressed by its methods. From this point of view, the relationship of the T. S.-F. to the Staff Notation resembles very greatly that between Algebra and Euclid.

Yet the T. S.-F. is but the handmaid of its elder sister, which it can never supplant for difficult modulations, or passages in full instrumental harmony.

The S. N. gains in facility of execution by expressing the passage in one particular key; its staff represents the different pitch of the notes, better than the horizontally written T. S.-F., though worse than the vertical modulator. Its time notation is however arbitrary to a great extent whilst the duration of notes and rests are differently denoted.

The preponderance of advantages in commencing vocal music, especially with the young, undoubtedly remains with the T. S.-F.; and its propagandists have in addition much improved the methods of musical instruction, and have demonstrated the paramount importance of early ear-training.

The examination questions are where possible exactly the same for both Notations; and their order follows the main and generally even the detailed arrangement of the Syllabus. Under the head 'NOTES' the most numerous interrogations appear, no portion of the Syllabus is left untested and two general questions are often propounded.

No harmony has been required since 1886.

NOTES.—The student will be required (*a*) to re-write passage given in one staff an octave (or octaves) higher or lower in the other staff; (*b*) to write down the different forms of the Minor modes—to understand the relation of the Minor to the Major—to place a given phrase in a specified key and mode by inserting sharps, flats, or naturals; (*c*) to name the various intervals with their inversions (the pluperfect or augmented fourth or tritone and the minor third being the favourites); (*d*) to transpose a tune from one key to another; (*e*) and to state the key, the signature being given, and the signature, the key being given.

It should be noted that if a tune be raised one note in pitch, two more sharps or two less flats are required, and if lowered one note, two more flats or two less sharps are necessary.

Tonic sol-faists must understand (a) *the characteristics of notes;* (b) *minor phrasing corresponding to* (*or the shadow of*) *the major;* (c) *the names of the chromatic notes;* (d) *the removes of keys, the imperfect method, the distinguishing note of new key, the first, second, etc., sharp or flat keys;* (e) *and be able by means of chromatic names to transpose a tune without altering the pitch of the nominal tonic, which will be another note than DOH.*

TIME.—(*a*) The time value of various notes and rests is asked for, and fragments of bars and passages requiring completion are given; (*b*) a list of the various time-signatures should be prepared, and the time signature understood even when not inserted at the commencement; (*c*) syncopation and accent must be thoroughly mastered; (*d*) and transcription from one time to another kindred time be practised.

The remarks on TIME *apply mutatis mutandis to the requirements from Mr. Curwen's disciples.*

MUSICAL TERMS.—(*a*) All in ordinary use should be known, such as *forte, presto, dolce, da capo, dal segno, ad libitum, fortissimo, prestissimo, legato, a tempo, piu forte;* (*b*) and the equivalents of English phrases and words, *e.g., gradually slower, very fast, short and detached, soft, etc.* An acquaintance with Metronomic signs is requisite.

THE VOICE AND ITS TRAINING.—The Examinee must be prepared (*a*) to give the range of alto, tenor, treble, and bass voices, and the extent of boys' and girls' voices at different ages; (*b*) to describe a good voice exercise conducive to quality and sweetness, to enumerate the causes of flat singing, to discuss the question of occasional and long versus short and frequent practice, to mention the best vowels to use in training children's voices, and to explain the best means of developing the upper and lower registers.

GENERAL QUESTIONS.—1. Write out the time and tune of 'God save the Queen.'

2. Under what heads would you give marks in adjudicating at a school choir competition?

3. Draw up a series of tests for the various musical divisions of an Elementary school.

4. What are the ordinary defects of children's singing?

5. If treble and bass voices sing the same passage, will they sing at the same pitch?

6. In what scale or mode is there an interval of more than a tone between two consecutive notes?

LANGUAGE.

The Syllabus for Males mentions four languages, Latin, Greek, French and German, to which may be added Political Economy. From these five subjects any one or two (but not more) may be selected by the candidate.

By Females, but one language may be taken, and their choice is restricted to Latin, French and German.

Only those teachers who have creditably passed the First Year's papers in Geography, History, Arithmetic, Algebra, Mensuration and Geometry will be allowed to be examined in languages, and students in training are not allowed an individual choice, but may only take those languages for which a special course of instruction is provided in the Time-table of their College.

Two books in each language are prescribed, viz. :—

Latin.—(1) Cæsar, Gallic War, Book VII. or (1) *Salluot's Cataline*, and (2) Odes of Horace, Books III. and IV.

Greek.—(1) Xenophon's Cyropædia, Book I., and (2) Euripides' Andromache.

French.—(1) Lamartine's Jeanne d'Arc, and (2) Scribe's Le Verre d'Eau.

German.—(1) Schiller's Thirty Years' War, and (2) Goethe's Hermann and Dorothea.

Political Economy has been fully treated of in our last lucubration.

The papers will contain fairly difficult passages for translation from and into English prose, together with questions upon constructions, idioms, and ordinary grammar.

Our space will not permit us to review each book, or to advise the candidate in detail, but this is rendered less necessary through Mr. Bower's French translations published in this periodical, the initiation of Hughes' French and German Journal, and the Model Answers to the last Certificate Questions, which all our readers should be familiar with.

The remarks on pp. 162—3 in Gladman's School Management, on the self-teaching of Latin are most excellent, and are generally applicable to the study of Aryan languages.

This month the Routines are discontinued. With respect to covering the area of study by three hours' daily work, our promises have been fulfilled, and our calculations verified. Moreover, ample time for revision has already been afforded, and yet six weeks remain before the advent of the fateful test. The inquisitorial mind, too, has been tracked to its lair, its windings have been painfully followed, probably questions have been suggested, a detailed and even lengthy analysis and syllabus of every subject provided, and the scope, nature, and tendency of each fully commented upon. We earnestly ask our students (with many of whom we have come into personal contact) to increase their efforts as the Examination looms larger, to revise, re-revise, and revise yet again, to study the Model Answers furnished by 'THE PRACTICAL TEACHER,' and to apply to themselves as many tests as possible, in order to discover whether the knowledge acquired and the processes learnt are easily reproduced and thoroughly understood.

It is true that History repeats itself, it is equally correct (as all 'Coaches' know) that examination questions perpetually recur.

This being so, we advise :

1st, a thorough revision of all subjects (*a*) From the Text Books; (*b*) In the order of our Analyses.

2nd, Frequent practice, on paper, of examination answering, special attention being paid to the time and space occupied.

Of course in revising, the dry facts and figures require most attention. Mental processes, rational inferences, and ideas (as distinguished from facts) being most easily retained and disinterred by the logical mind. With regard to this, however, the reader should study his own idiosyncrasy, and fortify his vulnerable points.

The weakest parts (perhaps unavoidably) of our Routines relate to Dates, Lives of Eminent Men, Social condition of the People, Music, and the Essays. The knowledge of these should be strengthened, and the text of the book set for English frequently perused. We give test papers on the various subjects, the questions where possible being identical with those previously given, and in other cases moulded in the same matrix.

SCHOOL MANAGEMENT.

MALES AND FEMALES.

N.B.—Question I. *must not be omitted by any Candidate.* Not more than EIGHT questions may be answered.

(*Three hours allowed for this Paper.*)

I. Give rules (*a*) For finding the annual and weekly average; (*b*) With regard to removing a scholar's name from the register; (*c*) With respect to qualification of a scholar for entry on the Examination Schedule; and (*d*) For keeping the Admission Register.

II. A school in Birmingham has an average of 250 scholars. What teaching staff should be provided? How would you distribute it? What time per week should be devoted to (*a*) The three R's; (*b*) Class Subjects; (*c*) Other Subjects?

III. Give a specimen of the sort of Black-board sketch which would be suitable for a lesson on (1) The Adjective; (2) Lakes, or (3) Our Parliament. What practical use would you make of this sketch?

IV. Criticise Pestalozzi's methods of teaching (*a*) Language, and (*b*) Number. Discuss his saying 'The circle of knowledge begins close round a man, and thence stretches out concentrically.'

V. In teaching Reading, some teachers thoroughly master a lesson before proceeding to another; others pass on more quickly, but read through the book oftener. Which method do you prefer and why?

VI. Enumerate the ordinary methods of reasoning. Which of these appeals most strongly to the juvenile mind? What fallacies are children most liable to?

VII. What do you mean by the 'converse' of a proposition? Give some examples. Are there any cases where the 'converse' is necessarily true?

VIII. Explain each of these technical terms, and give an illustration of its use :—Hypothesis, Data, Sequence, Intension, and Induction.

IX. How did Pestalozzi's principles and practice differ? What were his views on Religious Education?

X. What are the conditions on which the healthiness of school premises depends? Within what limits can the teacher affect these?

XI. By what indirect means may the formation of good principles and habits be promoted among your scholars? What are the indications of good *tone* in a school?

XII. In what ways may children be punished for irregularity, untidiness, and inattention? Name some objectionable methods of punishments, giving reasons for your opinions.

XIII. What books on the philosophy of education do you intend to read, to supplement your certificate course, and render you more efficient as a teacher?

XIV. How do you purpose to train your Pupil-Teachers in the art of teaching, and what lessons do you consider most suitable for that purpose?

ALGEBRA, MENSURATION, & ARITHMETIC.

MALES.

(*Three hours allowed for this paper.*)

'Candidates are not permitted to answer more than NINE questions in Algebra, and TWO in Mensuration (or Arithmetic). The SOLUTION must be given at such length as to be intelligible to the examiner, otherwise the answer will be considered of no value.' (See answers to Correspondents.)

Algebra.—I. The geometrical mean of two numbers is also the geometrical mean between the arithmetical mean of the two numbers and their harmonical mean.

The harmonic mean between two quantities is $\frac{4}{5}$ of the geometric, and the arithmetical mean is 5. Find the quantities.

II. Simplify (*a*) $\dfrac{(2+\sqrt{3})^{\frac{3}{2}}+(2-\sqrt{3})^{\frac{3}{2}}}{\sqrt{6}}$

(*b*) $\dfrac{x+a+\sqrt{x^2-a^2}}{x+a-\sqrt{x^2-a^2}}$

III. If x have to y the duplicate ratio of $x+z$ to $y+z$, prove that z is a mean proportional between x and y.

If one quantity vary directly as another, and the former be $\frac{3}{4}$ when the latter is $\frac{3}{8}$, find what the latter will be when the former is 9.

IV. How many permutations can be made out of the letters of the word 'reverts'?

V. The number of combinations of n things taken 3 together is 24 times as great as that of the number of combinations of $\frac{n}{2}$ things taken 4 together; find n.

VI. If the sixth, seventh, and eighth terms of $(a+b)^m$ be 112, 7, and $\frac{1}{4}$, find a, b, and m.

VII. Show that in the common system of logarithms, the characteristic of the logarithm of any number can be determined by inspection.

Given log. 8 = ·9030900, log. 9 = ·954245, find logs. of $1\frac{1}{8}$, $\sqrt{\frac{3}{2}}$, $\sqrt[3]{1\frac{1}{3}}$.

VIII. A person borrows a sum of money, and pays off at the end of each year as much of the principal as he pays interest for that year. Find how much he owes at the end of n years.

IX. Solve the equations (*a*) $\sqrt{x} + \sqrt{y} = 4$

$$(b)\quad (a\sqrt{x} + b)(b\sqrt{x} + a) = ab\sqrt{x}\left(\sqrt[4]{x} + \frac{c}{\sqrt[4]{x}}\right)^2$$

X. A benevolent assembly gave away a certain sum of money. Had there been five persons more, and each had bestowed an additional shilling, the donation would have amounted to £6. Had there been three persons less, and each had bestowed eight pence less, the donation would have been diminished by 68 shillings. How many persons were there and what did each give?

XI. A man bought a number of fishing boats for £2,000. Some of these were then wrecked, but their insurance covered the loss except 10 per cent., which was £10 per boat. The remainder foundered at sea, but their insurance realised 20 per cent. gain. The total gain on all the boats was £100. How many boats were there at first, and how many were wrecked?

Mensuration.—($\pi = 3\frac{1}{7}$).

I. Find the ratio of the area of an equilateral triangle inscribed in a circle to that of the inscribed regular hexagon.

II. Find the height of a cylinder whose lateral surface is equal to double the surface of the base, and having a diameter of 10 ft.

III. Find the radius of a sphere which has the same volume as a cone, whose height $= h$, and radius of base $= r$.

Arithmetic.—I. If 14 ozs. of amalgam formed of 21 parts of gold and 3 parts of silver be worth 27 ozs. of amalgam formed of 10 parts of gold and 14 parts of silver, what is the relative value of gold and silver?

II. A, B, C, and D, whose rates of running are respectively $6\frac{1}{3}$, $7\frac{1}{2}$, $8\frac{1}{4}$, and 9 miles per hour, start at intervals of 6 minutes to run a course of 6 miles. Find which will arrive first, and the interval between his arrival and that of each of the other three.

III. A man leaves $\frac{1}{8}$ of his property to each of his three daughters, $\frac{1}{6}$ to each of two sons, and the remainder in legacies. He wished each son to receive £360 more than each daughter, but through miscalculation the difference was only £270. How much were the legacies, and how much had they lost by the miscalculation?

ARITHMETIC.

FEMALES.

Two hours and a half allowed for this Paper.

No candidate is permitted to answer more than TEN *questions.*

(*See also Directions to Male Candidates.*)

I. Explain the method of proving a simple multiplication sum by 'casting out the nines.'

II. Convert into their equivalent vulgar fractions $\cdot\dot{1}4285\dot{7}$ and $\cdot 04\dot{9}$. Prove by an example (using letters if possible) the rule for turning a 'Mixed Repeater' into a vulgar fraction.

III. Divide 1 by $\frac{1}{2}$, by $\frac{1}{100}$, by $\frac{1}{1000}$. What is the magnitude of unity divided by zero? Deduce your answer from a comparison of the three results of the first portion of this question.

IV. A is distant from B 164 miles 20 poles. A train running 40 miles per hour travels from A to B, another with a speed of 30 miles per hour journeys from B to A. How far from A will they meet?

V. A time-piece started at twelve o'clock loses at the rate of 4 per cent. What is the real time when the hands are next together?

VI. What practical use is square root? Extract the square root, without reducing to vulgar fractions, of $\cdot 4\dot{9}$, $\cdot\dot{5}$, and $\cdot\dot{7}88\dot{6}$ to four places of decimals.

VII. A, B and C start together to walk round a circular course 280 yards in circumference; the rates of walking are 4, 5, 6 miles respectively per hour. After what time will they all be together at the starting point, and how many rounds will each then have made?

VIII. A piece of wire was cut into two lengths, which bore the relation to one another of $\frac{3}{4}$ to $\frac{4}{5}$, and the difference in their lengths was 1 inch. What was the length of the wire?

IX. A legacy is to be divided among 17 persons, 16 of them receiving £45 10s. apiece, and the seventeenth the remainder, amounting to $\frac{3}{11}$ of the whole. What does he receive?

X. £1,000,000 is lent for two years at 5 per cent. compound interest. What difference in the total interest will it make if it were paid half-yearly instead of annually?

XI. Explain the rule for calculating discount. I promise to give a farmer two years from to day a flock of sheep numbering 686. If sheep increase their number 40 per cent. per annum, how many must I give him now to fulfil my promise? N.B.—Expense of their keep not to be reckoned.

XII. I bought 60 horses and 23 cows for £2,214; 10 horses and 8 cows died, and the remainder were sold for 5 per cent. profit, but realised altogether £355 10s. less than the original cost of all the beasts. What was the original price per cow?

XIII. What sum will amount to £3,515 4s. in three years at 4 per cent. compound interest?

XIV. Explain what is meant by stock, premium, par, and brokerage. A man buys Consols at a certain rate, and pays upon his dividend an income tax of 6d. in the £. The investment realizes $2\frac{1}{2}$ per cent. net. At what premium was the stock?

XV. By investing in the Three-and-a-Half per Cents. at 98, I have an income of £120. How much money did I invest?

EUCLID.

(*Three hours allowed for this paper.*)

Not more than EIGHT questions may be answered. Candidates are reminded that correct solutions of the deductions obtain high marks. Capital letters (excluding A, B, C, D, E, F), not numbers, must be used in the diagrams. The only signs allowed are + and =.

The square on PQ may be written 'sq. on PQ,' and the rectangle contained by PQ and RS, 'rect. PQ, RS.' Other abbreviations, if employed, must not be ambiguous.

I. If two triangles have two sides of the one equal respectively to sides of the other, and their 'included' angles equal, their third sides will be equal.

Draw a diagram showing that this theorem is not necessarily correct if the equal angles are not the 'included' ones.

II. All the exterior angles of any rectilineal figure are together equal to four right angles. What limitation is necessary to the truth of this theorem?

III. Describe a square that shall be equal to a given rectangle.

If in any right angled triangle a perpendicular be dropped from the right angle to the hypotenuse, the square on the perpendicular shall be equal to the rectangle contained by the segments of the base.

IV. Two circles cannot touch each other externally at more points than one.

Prove this theorem also by Euclid III. 12, and Axiom 10.

V. From a point without a given circle, to draw a tangent to the given circle.

Two circles are concentric. If two chords of the exterior circle be tangents of the interior circle, these chords are equal.

VI. The opposite angles of any quadrilateral figure inscribed in a circle are together equal to two right angles.

What is the converse of this theorem? Prove that only equiangular parallelograms can be inscribed in circles.

VII. If from any point without a circle there be drawn two straight lines, one of which cuts the circle, and the othes meets it, and if the rectangle contained by the whole line which cuts the circle, and the part of it without the circle, be equal to the square on the line which meets the circle, the line which meets the circle shall touch it.

Describe a circle which shall pass through two given points and touch a given circle.

VIII. To describe a circle about a given triangle.

If the straight line joining the centres of the inscribed and circumscribed circles of a triangle pass through one of its angular points, the triangle is isosceles.

IX. To describe an equilateral and equiangular pentagon in a given circle.

If one of the interior angles of a regular pentagon be trisected, the two trisectors will be parallel to two sides of the polygon.

X. If the vertical angle of a triangle be bisected by a straight line which also cuts the base, the segments of the base shall have the same ratio which the other sides of the triangle have to one another.

If in any triangle a segment of the base equal to the adjacent side be taken, the line joining the vertex to the point of section divides the vertical angle into two unequal parts.

XI. Give Euclid's definition of ratio. Explain the phrase homologous sides.

A square is inscribed in a right angled triangle ABC, one side DE of the square coinciding with the hypotenuse AB of the triangle. Show that the area of the square is equal to the rectangle AD, BE.

XII. The sum of the squares upon lines drawn from a fixed point to the extremities of any diameter of a fixed circle is invariable.

DOMESTIC ECONOMY.

(*Three hours allowed for this paper.*)

No candidate is allowed to answer more than EIGHT questions.

I. 'Food is required for two purposes—the supply of solid waste, and the production of heat.' Describe a few of the typical (theoretically perfect) diets, stating the constituents of the articles which meet these requirements.

II. Describe, with exact statements of time, quantity and apparent waste in cooking, the processes of roasting, boiling, and stewing any piece of mutton.

III. Write out receipts for poaching an egg, frying a sole, boiling new potatoes, and making a plum cake.

IV. How would you make for invalids—a refreshing beverage, a light pudding, or meat soup?

V. State fully the qualifications of a good sick nurse.

VI. Explain any simple remedies which a teacher may resort to in the cases of—a severe bruise, a deep cut, a burn, a scald, an attack of fainting, and bleeding at the nose.

VII. In case of epidemics what disinfectants are the most efficacious? What rules should you adopt in case of any infectious illness breaking out in your dwelling-house?

VIII. Describe the system adopted for the investment of money in any land or building society. What are Government Annuities? Discuss the comparative advantages of the 'above' investments.

IX. Draw out Notes of Lessons to a first class on the principles, working, and advantages of Co-operative Stores.

X. Describe any good kitchen range with which you are acquainted, and explain its advantages under the heads of economy of fuel, cleanliness, improved cooking and safety.

XI. Draw up an account of a week's (five days) penny dinners for 200 poor school children, with details of cost and general arrangements.

XII. What are the particular points to be considered in selecting your dwelling-house? Give reasons.

GRAMMAR AND COMPOSITION.

FEMALES.

(*Three hours allowed for this paper.*)

No candidate must omit Questions 1 and 2, or answer more than *six other* questions.

Composition.—I. Write in plain language an essay on one of the following :—

(*a*) Any celebrated exhibition, such as the Manchester or Glasgow one.
(*b*) The character of Cassius.
(*c*) The influence of railways on prices.
(*d*) 'Knowledge is proud that he has learned so much ;
Wisdom is humble that he knows no more.'

Grammar.—II. Paraphrase *one* of the following passages, and explain fully the connexion in which it stands :—

(*a*) I could be well moved, if I were as you ;
If I could pray to move, prayers would move me.
But I am constant as the northern star,
Of whose true-fix'd and resting quality
There is no fellow in the firmament.
The skies are painted with unnumbered sparks,
They are all fire and every one doth shine,
But there's but one in all doth hold his place.
So in the world : 'tis furnished well with men,
And men are flesh and blood and apprehensive ;
Yet in the number I do know but one
That unassailable holds on his rank,
Unshaked of motion :

(*b*) I must prevent thee, Cimber,
These couchings and these lowly courtesies
Might fire the blood of ordinary men,
And turn pre-ordinance and first decree
Into the law of children. Be not fond,
To think that Cæsar bears such rebel blood
That will be thawed from the true quality
With that which melteth fools—I mean sweet words,
Low crooked court'sies and base spaniel-fawning.
Thy brother by decree is banished !
If thou dost bend and pray and fawn for him,
I spurn thee like a cur out of my way.

III. Say in what sense Shakespere used the following words, and give in each case the derivation :—

Indifferently, temper, marry ! factious, conceited, physical, fond, apprehensive, bootless, pricked.

IV. Analyse the passage—

'I have as much of this in art as you,
But yet my nature could not bear it so.'

V. Comment on the grammar of the following passages, and parse the words printed in italics :—

(*a*) *Shall* we on? (*b*) The noble Brutus *is ascended.* (*c*) This was the *most unkindest* cut of all. (*d*) But one in all doth hold *his* place. (*e*) You are much condemned *to have* an itching palm.

VI. Take any of these characters—Portia, Lepidus, Casca, and say what part he (or she) plays in the drama, illustrating your answer by quotations.

VII. 'It was due, above all, to the great satirist, who alone knew how to use ridicule without abusing it; who, without inflicting a wound, effected a great social reform ; and who reconciled wit and virtue, after a long and disastrous separation, during which wit had been led astray by profligacy and virtue by fanaticism.' Comment on the various assertions of the above passage. How does it illustrate Macaulay's style?

VIII. In what group of Shakespere's plays is 'Cæsar' to be placed? When was it written, and what plays of Shakespere's most resemble it?

IX. Can you recall any words, phrases, or grammatical forms used in this play, but which are now obsolete?

X. Continue for another line, three of the following passages :—

(*a*) Where beggars die, there are no comets seen :
(*b*) Cæsar's spirit——————————
Shall in these confines with a monarch's voice
(*c*) O, what a fall was there my countrymen :
(*d*) O Cassius, you are yoked with a lamb.

Penmanship :—Write in large hand as a specimen of Penmanship, the words—

William Shakespere.

Write in small hand the sentence—

I had rather be a dog and bay the moon than such a Roman.

GRAMMAR AND COMPOSITION.

MALES.

(*Three hours allowed for this paper.*)

No candidate may omit the exercise in Composition. Question I. in Grammar must be answered by all, and any five of the other six questions may be taken, but five only.

Composition.—Write in plain prose an essay on *one* of the following subjects :—

(*a*) A rolling stone gathers no moss.
Or, (*b*) There is a tide in the affairs of men
Which, taken at the flood, leads on to fortune.
(*c*) The virtuous mind doth ever walk attended
By a strong siding champion—Conscience.

Grammar.—I. Paraphrase *three* of the following passages :—

(*a*) I could be well moved if I were as you;
If I could pray to move, prayers would move me;
But I am constant as the northern star,
Of whose true-fix'd and resting quality
There is no fellow in the firmament.

(*b*) His silver hairs
Will purchase us a good opinion
And buy men's voices to commend our deeds:
It shall be said, his judgment ruled our hands;
Our youths and wildness shall no whit appear,
But all be buried in his gravity.

(*c*) If all the world
Should in a fit of temperance feed on pulse,
Drink the clear stream, and nothing wear but frieze,
The All-giver would be unthank'd, would be unprais'd,
Not half his riches known, and yet despised.

(*d*) We will not take upon ourselves the invidious office of settling precedency between two such writers. Each in his own department is incomparable; and each, we may remark, has wisely, or fortunately, taken a subject adapted to exhibit his peculiar talent to the greatest advantage.

II. Explain *six* of the following :—Being mechanical, you ought not to walk upon a labouring day without the sign of your profession. In Parthia did I take thee prisoner. He doth bestride the narrow world like a Colossus. The Ides of March. Lay it in the prætor's chair, where Brutus may but find it. I held Epicurus strong. My ancestors did from the streets of Rome the Tarquin drive. One that feeds on abjects, orts, and imitations. They could not find a heart within the beast.

III. Explain two of the following passages, stating the circumstances under which they occur :—

(*a*) I remember
The first time ever Cæsar put it on;
'Twas on a summer's evening in his tent
That day he overcame the Nervii.

(*b*) But, for mine own part, it was Greek to me.

(*c*) Between the acting of a dreadful thing,
And the first motion, all the interim is
Like a phantasma, or a hideous dream.
The Genius and the mortal instruments
Are then in council.

IV. Comment on two of the following extracts :—

(*a*) Two such I saw, what time the labour'd ox
In his loose traces from the furrow came,
And the swink't hedger at his supper sate.

(*b*) Peace brother, be not over exquisite
To cast the fashion of uncertain ills.

(*c*) What chance, good lady, hath bereft you thus?
Dim darkness, and this leafy labyrinth.
Could that divide you from near ushering guides?
They left me weary on a grassy turf.

V. Sketch briefly the character of Cassius.

VI. Comment briefly on four of the following :—The subject of Milton, in some points, resembled that of Dante; but he has treated it in a widely different manner—They went through the world like Sir Artegal's iron man Talus—He has not a word to say of the illustrious dead of Santa Croce—Cato did as much as the Tatlers, Spectators and Freeholders united to raise Addison's fame—Bless thee! Homer; thou art translated indeed.

VII. Give briefly the plot of Comus, *or* a short outline of Anthony's speech.

N.B.—Test papers on Geography, History, French, Latin, Music, Political Economy and Needlework will appear next month. ANY CANDIDATE DESIROUS OF HAVING HIS ANSWERS TO THE ABOVE QUESTIONS (AND THOSE TO BE SET NEXT MONTH) THOROUGHLY EXAMINED, SHOULD FORWARD THEM, TOGETHER WITH P.O.O. FOR HALF-A-CROWN, TO 'THE EDITOR OF THE PRACTICAL TEACHER,' BEFORE THE 13TH OF EACH MONTH.

ANSWERS TO CORRESPONDENTS.

We shall be pleased to reply briefly and through this column to any seeking information or advice, but we are compelled to decline working problems, &c. Answers demanding urgency will be promptly forwarded per post on receipt of stamped and addressed envelope.

In answer to several correspondents, and also as supplementing our various replies sent per post, we particularly call attention to the following paragraph, this year inserted in the Syllabus for the first time:—

'*The Paper on Algebra and Mensuration will also contain some questions on Arithmetic. Students and Acting Teachers who have not passed with credit in Arithmetic in the preceding year, or who have failed to obtain a certificate, must answer the questions in Arithmetic, INSTEAD OF those on Mensuration.*'

SELF-HELP.—We are compelled to decline to examine worked papers, either gratuitously or for remuneration. But see "N.B.," supra.

A. S. (near Bradford).—Kindly address to 'The Query Editor' of PRACTICAL TEACHER.

H. P. S. (Wolverhampton), J. E. R. (March), T. B. (Sheffield), G. F. V. (Merthyr), CONSTANT READER (Cheadle), RUSTICUS (Aylesbury), S. H. (Birmingham), T. R. N. AND S. B. (Darlington), NEMO (Stockport), answered per ordinary letter.

EX-P. T. (Birmingham), EX-P. T. (Smethwick), W. B. (Cardiff).—See supra.

OBLIGED (Sheffield).—One only of your Science subjects will count.

M. S. S.—See our notes on music in this month's issue.

H. A. J. (Cheltenham) and B. C. (Newcastle, Staffs.).—Our plan does not contemplate the supercession of Manuals; and accordingly we have not commented 'in extenso' on the given play and essays. Procure Stevenson and Whalley's Addison, published by Mackie & Co., Warrington.

(To be continued.)

How a Scotch School was Examined.

Infants.—In Class I., each child read a few lines from Nelson's Infant Reader.

Writing.—Capital letters K, M, W, Y, S, and the same small; and besides these they wrote their names.

Mental Arithmetic.—7 and 6? 7 and 3? 8 and 5? 2 from 8? 1 from 10? 4 from 12? How many in a dozen? In a score? A pair? 5 pairs? &c.

Class II. read from Nelson's Primer, and were asked to spell small words.

Writing.—1. Small letters c, h, a, i, n.
2. Copied from board 'come,' 'man.'

Mental Arithmetic.—5 and 2? 4 and 3? 6 and 4? 4 apples and 2 more? Tom had 6 apples but lost 3, how many left? 6 from 6? &c.

Class III. read on large reading sheets.

Writing.—Copied from board, a, e, i, o, u, also figures 2, 4, 5, 6.

Arithmetic.—Counted the balls on the ball-frame.

Singing.—Infants and Standard I. sang together two songs, one of which was 'Action.'

Note Tests.—d m s d' d m r d t, d.

Object Lesson.—Teacher questioned on an 'Orange.'

No sewing or needle drill taken.

STANDARD I.

Reading.—1. This was taken from Nelson's Royal Reader, I., and every second child read a sentence.

2. Questions on the subject-matter were asked round the class.

3. Spelling of short words taken.

Writing.—Each child wrote the first line of the lesson read.

Singing was the same as Infants.

Needlework was not taken.

Arithmetic.—

A. 1. 405 + 720 + 700 + 609 + 90. 2,524. Ans.
2. 684 + 765 + 897 + 749 + 111. 3,206. Ans.
3. 702 − 195. 507. Ans.
B. 1. 900 + 701 + 800 + 905 + 19. 3,325. Ans.
2. 795 + 876 + 908 + 850 + 222. 3,651. Ans.
3. 803 − 296. 507. Ans.

STANDARD II.

Read from both sets of books—Star Readers and Chambers' Graduated. A few sentences were read, and then they were told to turn over, say to page 45, and there a few sentences were read, and a change made to the other set.

Some meanings of single words were taken, and the class tested generally as to knowledge of verbs and adjectives.

Writing.—Copy-books looked; pupils were told to open these at the worst page.

Dictation.—'At one end of the saw a handle is fixed. The person who uses the saw takes hold of the handle and forces the saw up and down through the wood.'

Arithmetic.—1. 9007 + 7080 + 900 + 8790 + 9876 + 7698 + 7695 (*words*). 50,146. Ans.
2. 7,012,034—913,048 (*figures*). 6,098,986. Ans.
3. 8,647,530 × 6. 51,885,180. Ans.

For *Music*, see Standard III.

Standard III. read alternately from Star Reader III, and from Scottish Reader III. in the same fashion as Standard II., the Grammar and Analysis being taken after they had all read. Simple sentences were chosen from both books and questions were given on verbs, nouns and adjectives. Meanings were asked as usual.

Recitation:—'The Village Blacksmith'—A few lines repeated by the individual members of the class pointed at by the inspector, and the meanings taken after the manner of an object lesson.

Dictation:—'When all are linked together, the monkeys at the lower end of the chain make it to swing to and fro across the stream. It swings further and further each time, till at last the monkey at the bottom of the chain gets within reach of a tree on the opposite side. He grasps a branch and holds on by it firmly.'

Arithmetic.—1. From £10,000 take £90 10s. 0¼d.
£9,909 9s. 11¾d. Ans.

2. Multiply eight hundred and forty-seven thousand six hundred and ninety-five by eight thousand nine hundred and seven. 7,550,419,365. Ans.

3. Divide one hundred and forty thousand eight hundred by seven hundred and forty nine.
$187\frac{737}{749}$. Ans.

4. Divide 79,068,451 by 84 (*factors*).
$941{,}291\frac{7}{84}$. Ans.

History.—*Bruce.*—His native place—titles—murder of Comyn—coronation—Bannockburn—treaty of Northampton—death. Mary's birth—childhood—life in France—return to Scotland—imprisonment in Loch Leven—Langside—flight to England—treatment there—execution.

Geography.—Questioned as the examination on history was proceeding.

Teacher of class put some test questions on the mountains and rivers of Scotland.

Music.—Modulator (Key C.) **d f r s fe s l d' t l d' ta l s f r d.**

Ear Test.—(Voluntary.)—**d r m, m f s, s l t, l t d'.**

Singing taken with IV. V. VI. The inspector expressed his opinion that the singing of II. and III. should be taken at a different time from that of the higher standards.

Standard IV. professed Star Reader IV. and the Scottish Reader IV., but the first book was used entirely in testing for a pass. Grammar and analysis were taken from lesson read, but no great difficulty was experienced in these exercises. Meanings as usual were taken from the reading lesson, and phrases too were asked to be explained. Writing copies were not looked.

Dictation.—'On reaching the gate at the entrance to his house, he found it closed, but the frightened horse dashed it open, and carried its master safely into the courtyard. They were followed by nine out of the eleven wolves, but most fortunately at the very instant that the wolves entered, the gate swung back on its hinges, and thus they were caught as in a trap. In a moment the cowardly creatures became completely changed.'

Recitation.—'I hear thee speak of a better land' and 'Burial of Sir John Moore.' A verse from each, and meanings of phrases and words. A few questions were given to see how much they knew of the 'Life of Sir John Moore' and of the events of the Peninsular war.

Arithmetic.—(1) Divide £406,921 12s 3d. by 468.
£869 9s. 9¾d. Ans.

(2) Multiply £64 18s. 7¼d. by 48.
£3,116 13s. 0¼d. Ans.

(3) Reduce six hundred and eighteen thousand three hundred and five ounces to hundredweights.
345 cwts. 0 qrs. 4 lbs. 1 oz. Ans.

(4) How many persons will get allotments of 3 acres out of 40,800 sq. poles?
85 persons. Ans.

History.—The class generally was questioned (1) on the reign of James I., touching on the Gunpowder Plot, Ulster, and the Spanish Match; (2) on Anne's reign, Treaty of Union, War of the Spanish Succession, with Marlborough's Life and Victories; Gibraltar.

Geography.—Localities of principal British industries; which side of Britain mountainous, result of this; cities and towns on Clyde, Mersey, Thames, and Severn; a voyage round the South and West coasts of England.

Standard V. professed a History and Geography Reader, as also Star Reader VI., which they read in conjunction with Standard VI. Lesson taken was 'Upward,' p. 73. Explanation. Grammar and Analysis were taken from the same, and, as will be seen, the difficulties were not great.

Recitation was taken along with VI., which see.

Abstract.—'The Monkey and the Mirror.'

Arithmetic.—(1) Find the value of 6 boxes, two weighing $1\frac{1}{2}$ cwts. each and four weighing 2 qrs. 7 lbs. each at $6\frac{1}{2}$d. per lb.

£15 18s. 6d. Ans.

(2) Make out the following bill:—
11 lbs. coffee at $1\frac{1}{2}$d. per oz.
18 lbs. flour at $5\frac{3}{4}$d. per lb.
1 cwt. soap at $2\frac{1}{2}$d. per lb.
17 pecks meal at 1s. 2d. per peck.
£1 2s. + 8s. $7\frac{1}{2}$d. + £1 3s. 4d. + 19s. 10d.
= £3 13s. $9\frac{1}{2}$d. Ans.

(3) If 2 qrs. $3\frac{1}{2}$ lbs. be carried for 4s. 4d. what weight will be carried for £1 18s. 6d.?

4 cwt., 2 qrs., $24\frac{33}{52}$ lbs. Ans.

(4) Simplify $(\frac{2}{3}$ of $5\frac{1}{2}) \div (\frac{1}{2} - \frac{1}{3})$.

22. Ans.

History.—The portion particularly gone into comprised the events from 1789 to 1816. The lives of Nelson and Wellington afforded ample scope for interrogation.

Geography.—As in Standard IV. the places in the historical lesson formed the basis of a number of questions, and besides these the mountains and rivers of Southern Europe, together with the principal seaports, were largely run upon.

Standard VI. read the same book as Standard V., Nelson's Star Reader No. VI., and were called upon to point out easy prefixes and affixes, and show the effect these had in modifying the meaning of words, and in making new ones. The analysis was not too easy, but they satisfied the inspector if able to distinguish a compound from a complex sentence. The parsing was easy.

Writing.—Composition of an essay on 'Farm Work,' or 'A Dream.'

Arithmetic.—1. At what rate per cent. will £1,050 in two years produce £84 at simple interest?

4 per cent. Ans.

2. Reduce $3\frac{3}{7}$ of £2 15s. to the fraction of £3 17s.

$\frac{1320}{539}$ or $2\frac{142}{539}$. Ans.

3. A train travelling 33 miles an hour does a journey in 2 hrs. 15 min.; how long will an express going at the rate of 54 miles an hour take to do double the distance? 2 hrs. 45 min. Ans.

4. Reduce 4 miles 3 fur. 12 yds. to the decimal of 1 mile. $4\cdot 3\dot{8}\dot{1}$. Ans.

Geography.—Draw a map of (1) S. America, (2) India, (3) New Zealand. Oral examination on S. America and British India; general features, towns, and a few notes.

History.—All the principal wars of the present reign, with particulars of the Crimean War, and of the Indian Mutiny.

Recitation.—Standards V. and VI. had prepared the same piece from 'The Lady of the Lake.' Phrases, words and a question or two to discover if any of the class knew what was meant by figures of speech as contrasted with 'parts of speech.'

Music.—Modulator.—Key C. **d f l d' r' t s d' ta l se l s fe s m r t_1 d l se l t d'** with transitions to right and left and back again to C.

Ear Test.—(Voluntary.)—C struck on harmonium.—**dms, dfrm, sfels, dfls, dtsl.**

Time Exercise.—

| l :— :l | — :l :l | — : :l | l :— :— ||

Sight Test.—Key D.

| d :— :f | s :fe :s | l :— :m }
| d :t_1 :l_1 | t_1 :d :— | s :l :— }
| s :— :f | m :m.r :r.t_1 | d :— :— ||

Much more stress was laid upon the above than on the singing of a prepared song, though praise was given for the manner in which the pupils showed the 'light and shade.'

Sewing was examined as per Schedule 3.

—o—

How my School was Examined.

BY THE

HEAD MASTER OF A LONDON SCHOOL.

Two or three days before the day appointed for the examination, Her Majesty's Inspector visited the school to hear the pupil-teachers' reading, recitation, and teaching. For a test in the latter subject, the pupil-teacher gave a reading lesson to Standard I.

At the time fixed for the examination, the chief inspector, sub-inspector, and two assistants, came to the school and divided the work amongst them. Standards III. and IV. were seated alternately in two rooms with a sliding partition, and set to their paper work, cards being given for arithmetic, and the dictation given out afterwards by one of the assistant inspectors. In each case the teacher of the Standard was allowed to repeat the passage dictated.

Standards V. and VI. were similarly intermingled in another room, and the work arranged by another of the inspectorial staff. Standards I. and II. were examined in separate rooms by the other inspectors. The reading of the various Standards was examined by the different inspectors as the written work was completed. In this way the ordinary essential subjects were speedily dealt with, and the classes dismissed without any serious overstepping of the usual time for closing morning school.

Afterwards, the class subjects—English, geography, and singing—were taken in the different Standards, map drawing in Standards V. and VI., and stages I. and II. in Algebra. Standard III. being a large standard was divided into two parts for class subjects; one was examined orally in English, and the other in geography.

STANDARD I.

Arithmetic.—One addition and two subtraction sums as follows:—

	(1)	(2)	(3)
A.	9 780 655 874 607	903 207	941 33
B.	9 780 655 874 761	805 106	702 5

Answers.—*A.* (1) 2,925; (2) 696; (3) 908.
B. (1) 3,079; (2) 699; (3) 697.

Writing.—The same words were dictated to the whole class:—*Robin, sister, Monday, crumbs, bread, morning, snow, boots, white, coat.*

Reading was tested from the Holborn New Reader, No. I., the lesson chosen being 'The Little Swineherd;' and from Nelson's New Royal Reader.

Recitation was heard separately and together, the piece prepared being 'Robin Redbreast,' by William Allingham. Simple questions were asked, such as Why is the robin called red-breast? What does *ruddy* mean? Why are 'the frosty ways like iron'? The meaning of 'plumed'?

Mental Arithmetic questions were asked generally, and certain boys selected to answer. If I buy a loaf for 3½d. and pay for it with a shilling, how much change must I have? If all the change is given in halfpennies, how many will there be? How many halfpennies in 3½d.? How many in a shilling? What two numbers added together will make 17? What other two? How many are 5 times 6? and so on.

Geography.—Easy questions were asked on the meaning of a map. Which part is the north? What do these wavy lines represent? Which is the north of the room? Where does the sun rise?

Singing.—A simple voluntary was pointed on the modulator, and the following time test written on the black-board:—

|1 : —:—|1 :—|1 :—|1 :—|—:1 |1 :1 |—:1 ‖

Questions were asked on the kind of measure. The last measure is noticeable as difficult for Standard I. The songs sung were 'Come, let us take a holiday,' and 'Winter, thou art very cold.'

STANDARD II.

Arithmetic.—Two sets of sums were dictated.
A. (1) 42,856 × 86.
(2) 7,395 × 407.
(3) 40,009 ÷ 9.
(4) 20,060 — 111.
B. (1) 42,856 × 57.
(2) 7,395 × 309.
(3) 40,009 ÷ 8.
(4) 20,060 — 101.

Answers. —*A.* (1) 3,685,616; (2) 3,009,765; (3) 4,445 + 4; (4) 19,949.
B. (1) 2,442,792; (2) 2,285,055; (3) 5,001 + 1; (4) 19,959.

Dictation.—The following passage was dictated from Nelson's New Royal Reader, No. I.:—'The widow felt glad when the thought flashed through her mind. She found that if she worked an hour later each night, she could earn enough to pay for the oil to feed the lamp. So she sat up and earned the money to buy the oil. Then she trimmed the lamp, and placed it at the window each night.'

Reading was tested from the same book as the dictation.

English.—The grammar questions were based on the reading lessons, boys being asked for verbs and nouns in the passages read. The piece prepared for recitation was Mrs. Hemans' 'Casabianca,' and easy questions were given on the meaning of the story.

Geography.—In this subject the teacher was allowed to ask the questions.

Singing.—A voluntary was pointed on the modulator, and the following time-test sung from the black-board:—

|1 :—:—|1 :1 :1 |1 :—:1 |1 :—:—‖

The songs sung were 'Mr. Nobody,' and 'To the Woods.'

STANDARD III.

Arithmetic.—Samples of cards set:—

A. (1) Add £88,769 15s. 8¾d., £807 17s. 11½d., £97,096 9s. 9¼d., £78,654 18s. 10¾d., £19 16s. 7½d.

(2) Subtract £10,429 15s. 6½d. from £11,019 11s. 0¼d.

(3) Take 19 times 190 from half-a-million.

(4) There are ten houses, each containing 12 windows with 24 panes in each window, and 9 windows with 20 panes each; and there are 12 houses, each containing 15 windows with 24 panes in each window. How many panes of glass are there altogether?

B. (1) Add £809 18s. 6½d., £74,980 16s. 9¼d., £87,658 9s. 11½d., £4,839 17s. 10¾d., £88 18s. 8½d.

(2) From £61,002 10s. 6d. take £59,463 12s. 10½d.

(3) A man has a holiday of three weeks at the sea-side. The first week he spends £2 17s. 6d., the

second week he spends £2 12s. 6d.; and then he finds that he has spent 30 shillings more than the half of what he had at first. How much has he left for the third week?

(4) Divide five hundred thousand and ten by one hundred and twenty-six.

C. (1) Add together £57,098 10s. 11¼d., £68,754 18s. 7¾d., £903 17s. 8½d., £6,580 9s. 6¾d., £47,927 14s. 10¾d.

(2) Divide nine hundred thousand three hundred and fifty by ninety-seven.

(3) Take £8,922 15s. 4¾d. from £90,212 11s. 2d.

(4) In a class of 40 boys, fifteen had 4 sums right each, ten had 3 each, eight had 2 each, and the remainder had 1 each. How many sums were done right?

D. (1) Add £6,587 18s. 9¾d., £76,093 14s. 10½d., £869 8s. 0¼d., £84,008 17s. 11d., £5,674 16s. 8¾d.

(2) Divide nine hundred and one thousand three hundred and ten by nine hundred and seven.

(3) Subtract £7,263 0s. 7¼d. from ten thousand pounds.

(4) If the number of boys in a school were twice as many as it is, there would be 74 less than a thousand. How many does the school contain?

In the above sums many of the amounts were expressed in words.

Answers:.—*A.* (1) £265,348 18s. 11¾d.; (2) £589 15s. 5¾d.; (3) 496,390; (4) 9,000 panes.

B. (1) £168,378 1s. 10½d.; (2) £1,538 17s. 7½d.; (3) £2 10s. 0d.; (4) 3,968 + 42.

C. (1) £181,265 11s. 9d.; (2) 9,281 + 93; (3) £81,289 15s. 9¼d.; (4) 113 sums right.

D. (1) £173,234 16s. 4¼d.; (2) 993 + 659; (3) £2,736 19s. 4¾d.; (4) 463 boys.

Dictation.—The following passage was dictated from Longman's New Reader, No. 3:—

'But even the strength of the younger lads seemed to grow into the strength of giants when they saw through the clear water a great moving mass like quicksilver. And then the wild excitement of hauling in—the difficulty of it—the chance of the fish escaping—the warning cries of Rob—the danger of swamping the boat!'

Reading was heard from Longman's New Reader, Moffatt's Stories from English History, and Gill's Whitehall Geographical Reader.

Mental Arithmetic included such questions as—What are the factors of 30? of 48? other factors of same numbers? How many farthings in a shilling? pence in half-a-crown? half-crowns in a pound?

English.—The piece recited was Longfellow's 'Wreck of the Hesperus.' Such questions were asked as—What is the 'skipper'? What words are used to represent the wind? What does 'lashed' mean? Why was the daughter lashed to the helm? What is a 'scornful laugh'?

The *Grammar* was tested by asking for the parts of speech in sentences read.

Geography.—Such questions were asked as related to the occupations of the people in different parts of the country, and the reasons for manufactures and other industrial pursuits being carried on in particular districts.

Singing.—A voluntary pointed on the modulator, including all the intervals in the diatonic scale, and particularly the phrase **d' ta l t d'**. The songs sung were:—'The Crystal Spring,' 'Strike up a joyful roundelay,' and 'Wanderer through moor and wildwood.'

STANDARD IV.

Arithmetic.—Specimen cards:—

A. (1) Multiply £639 10s. 0¼d. by 609.
(2) Divide £272,541 7s. 11d. by 290.
(3) Reduce 1 square mile 3 roods 3 square yards to square feet.
(4) John saves 1d. per day, and James 6d. per week; how much does each save in 3 years?

B. (1) Reduce 79 acres 3 roods 20 poles 5½ square yards to square yards.
(2) Divide £7,060 18s. 10d. by 73.
(3.) Find the cost of 57 couples of rabbits at 1s. 9d. each.
(4) A man undertook to cut 27 lengths, each 7½ inches, out of a plank 5½ yards long. How much was it too short?

C. (1) Divide £1,076 4s. 3¾d. by 527.
(2) Multiply £19 19s. 11¾d. by 749.
(3) How many times will a clock tick in a day, if it ticks once every half second?
(4) How many lbs. of tea at 3s. 4d. per lb. will cost the same as 150 lbs. of coffee at 1s. 4d. per lb.?

D. (1) Reduce 81 cwt. 1 qr. 9 lbs. to drams.
(2) How much will 1 ton of coals cost if 135 tons cost £180?
(3) Divide £7,250 10s. 6d. by 23.
(4) How many hurdles 5 ft. 6 in. long can I get out of a fence 17 miles 5 furlongs 27 poles long?

Answers.—*A.* (1) £389,456 2s. 8¼d.; (2) £939 15s. 11½d.; (3) 17,021,097 square feet; (4) John £5 15s. 3d., James £3 18s.

B. (1) 386,600½ square yards; (2) £96 14s. 4¼d. + 57; (3) £9 19s. 6d.; (4) 4½ inches.

C. (1) £2 0s. 10d. + 247f.; (2) £14,979 4s. 4¾d; (3) 172,800 times; (4) 60 lbs.

D. (1) 2,315,904 drams; (2) £1 6s. 8d.; (3) £315 4s. 9½d. + 14; (4) 17,001 hurdles.

Dictation.—The following passage was read out from Nelson's Royal Reader, No. IV.:—

'Two boys were apprenticed in a carpenter's shop. One determined to make himself a thorough workman, the other "didn't care." One read and studied and got books that would help him to understand the principles of his trade. He spent his evenings at home reading. His companion liked to go with other boys to have a "good game." "Come," he often said to his shopmate, "leave your old books; come with us. What's the use of all this reading?"'

Reading was tested from Gill's Albert Geographical Reader, Standard IV., Nelson's New Royal Reader, and Gardiner's Outlines of English History, Part I. The boys were called up, six at a time, and the three books were brought into use in the successive groups.

English.—The passage for recitation was 'The Chase,' from Scott's 'Lady of the Lake.' The lines were repeated by individual children, and questions were asked on the meanings of words and phrases, also on the mountains and lakes mentioned in the passage.

Then these two lines were taken, as a grammar test:—

'The deep-mouthed bloodhound's heavy bay
Resounded up the rocky way.'

Questions asked:—How many verbs are there in these lines? Which is the verb? Parse 'resounded.' What kind of adjective is 'deep-mouthed'? What number of degrees have adjectives? Compare 'deep-mouthed.' What is the case of 'bloodhound's'? Is it singular or plural? What does 'resounded' agree with? What do prepositions govern? In what case? Compare 'rocky.'

Geography.—What is the port of Edinburgh? What ports are on the Clyde? Why was the exhibition held in Glasgow? Where is linen made? Name other seaports of Scotland? A fishing village in the north of Scotland? A place noted for herrings? A river noted for salmon? Why is the Clyde a bad place for salmon? What is the chief town of the Hebrides? What Prince took his title from Edinburgh? What Prince took his title from Connaught? Name a packet-station on the north of Ireland. Name some rivers in Ireland. What is Belfast noted for? Name a port in the south. What are the chief exports from Cork? Where do they make gloves? What is the capital of Ireland? Name some towns in Munster—in Ulster—in Leinster—in Connaught.

Name a river in British Columbia. Name some Arctic explorers. Some straits and bays named after them. What are the divisions of Canada? What river in British Columbia is noted for salmon? Name a range of mountains in the west. Its two highest points. What animal is found in the Rocky Mountains? What is Manitoba noted for? Why is it so fertile? Name a great railway in Canada. What place would a farmer be likely to emigrate to?

Singing.—A long voluntary was pointed on the modulator, and a few ear-tests given. From five three-part songs, which had been prepared, three were chosen—Mendelssohn's 'The Woods,' Crampton's 'The Snail,' and Sieg's 'O'er the limpid azure.' The following test was given for sight-singing:—

Key D. Key G. Key D.
d s m f r d m s d$^{\prime}$ ^{d}'s f m r f m ^{m}l t d$^{\prime}$ s m d m r l s t$_{1}$ d,

and the following time-test:—

|1 :— :1 |1 :-.1: |1 :1.1:1 |1 : :1 ||

STANDARD V.

Arithmetic:—Specimen Cards:—

A. (1) Add $\frac{1}{6}+\frac{2}{3}+\frac{2}{7}+\frac{2}{9}$.

(2) Make out the following bill:—$2\frac{1}{2}$ lbs. at 3s. per lb., $\frac{1}{4}$ lb. at 1s. 9d. per lb., 12 lbs. at $9\frac{1}{2}$d. per lb., 8 lbs. at $2\frac{1}{2}$d. per lb., 108 lemons at 10d. per dozen.

(3) Find the cost of 29 qrs. 7 bush. 1 peck at £3 per quarter.

(4) A train carried 80 first-class passengers at 3d. per mile, 160 second-class passengers at $1\frac{1}{2}$d. per mile, and 240 third-class passengers at 1d. per mile. What will all the fares amount to for a journey of 65 miles?

B. (1) If 18 men mow a field in 12 days, how long will it take 9 men to do it?

(2) Find the cost, by practice, of laying a telegraph wire measuring 3 miles, 7 furlongs, 8 poles, at 1d. per yard for the wire and £4 10s. for the labour.

(3) Take $\frac{1}{3}$ from the sum of $\frac{2}{3}$ and $\frac{2}{9}$.

(4) Make a bill for 120 eggs at 9d. a dozen, $15\frac{1}{2}$ lbs. at $5\frac{1}{2}$d. per lb., 14 lbs., at 3d. per lb., 56 lbs. at $7\frac{3}{4}$d. per lb., and $19\frac{1}{2}$ lbs. at 7d. per lb.

Answers: A. (1) $1\frac{43}{120}$. (2) 7s. 6d. + $5\frac{1}{4}$d. + 9s. 6d. + 1s. 8d. + 7s. 6d = £1 6s. $7\frac{1}{4}$d. (3) £89 14s. $4\frac{1}{2}$d. (4) £195.

B. (1) 24 days. (2) £33 2s. (3) $\frac{5}{9}$. (4) 7s. 6d. + 7s. $1\frac{1}{4}$d. + 3s. 6d. + £1 16s. 2d. + 11s. $4\frac{1}{2}$d. = £3 5s. $7\frac{3}{4}$d.

Composition. This was examined by the inspector telling the following anecdote, and requiring the boys to reproduce it:

'An artist once visited a remote part of Scotland, and, seeing some dogs in a village, made some sketches of them in his note book. The next day when he went into the village to pursue his search for sketches, he was surprised to find a number of the dogs drowned in a pool. Noticing a little boy carrying a dog to a pool, he asked him what he was going to do with it, and the boy replied that he had been sent to drown it. He afterwards sought the reason of this wholesale drowning of dogs, and was told that the villagers had taken him for an exciseman, and they were afraid they would be fined for keeping dogs without a license; so they had drowned their dogs in order to avoid the tax.

STANDARD VI.

Arithmetic: The boys being intermingled with Standard V., the same set of sums was given to all.

(1) Add $\frac{1}{140}$ ton + $5\frac{1}{8}$ cwt. + $5\frac{3}{32}$ lbs. + $14\frac{1}{2}$ ozs.

(2) Find the value of

18·20725 + 33·25 + 718968 − 16·28975.

(3) The interest on £1,450 for two years is £108 15s. What is the rate of interest?

(4) One man earns as much as three boys, and four men and five boys working together earn £2 2s. 6d. in one day. What will one man and one boy earn?

Answers: (1) 5 cwt. 1 qr. 8 lbs. (2) 719003·1675. (3) $3\frac{3}{4}$ per cent. (4) 7s. 6d. + 2s. 6d. = 10s.

Composition.—Different exercises were given to different boys. The following were some of the subjects set:—

A. An account of an excursion into the country.

B. A visit to the seaside.

C. The children's Jubilee celebration in Hyde-park.

D. Railway bookstalls.

E. What trade would you like to be?

STANDARDS V. AND VI.

These two Standards having been taught as one class were in most other subjects examined together.

Reading was tested by reading from Longmans' New Standard Reader, No. 5, and Longmans' New Geographical Reader, Standard VI.

English.—Individual boys recited passages from the piece prepared, namely, the Quarrel between Brutus and Cassius from 'Julius Cæsar.' Simple questions were asked on the meaning.

Grammar was examined orally by questions on sentences read. Thus, 'Suddenly his grave face lighted up, and his stern grey eyes sparkled with joy.' How many sentences are there? Which are they? 'Far away along the eastern sky he saw a bristling line of tall masts, with a flag, which he knew well, floating out over them.' Which is the principal sentence? Parse *Far, away, along, sky, which,* and other words.

Analyse 'And attempts to throw off his new master, who sits calmly on his back.'

In the word *unfortunately*, what is *un?* What does it mean? What is *ly?* What does it do to the word?

Geography.—The course approved and prepared included Asia, Africa, and America; but the questioning was confined to Africa, and the teacher of the class was allowed to put some of the questions.

What important physical feature is there in Egypt? What natural phenomenon is remarkable there? What extent of country is affected by the inundation of the Nile? What part of the Nile has been lately explored? Name some of the famous travellers in Africa. What is Africa sometimes called? Why is it called the 'Dark Continent?' How are the mountains situated? What mountains are in the north? What kind of country lies south of the Atlas Mountains? What plague is now prevailing in North Africa, in Algiers? Where did Carthage formerly stand? What town is now near its site? Do the extreme heat and drought prevent communication amongst natives as they do amongst Europeans? Where is the Orange River? Why is it so called? Describe the navigation of the Orange River?

Three maps, approved the previous year, had been prepared for drawing from memory, namely: India, New Zealand, and the basin of the St. Lawrence. These were allotted to the boys in rotation and drawn on paper.

Singing:—The note and time tests on the blackboard were the same for Standards V. and VI. as those given for Standard IV. A few ear tests were given by the Inspector, and a rather long voluntary pointed on the modulator. The songs sung were 'The Hardy Norseman,' 'The Switzer's Song of Home,' and 'The Swabian Trooper's Song.'

STAGE I.

Algebra.—(1) Subtract the sum of $3a-2b$ and $2b+3c$ from $5a-b+2c$.

(2) Simplify $x^2-[9-\{3x+5-(4x+x^2)\}]$, and find the numerical value when $x=2$.

(3) Divide $x^4-p^2x^2+2pqx-q^4$ by x^2+px-q^2.

(4) Multiply together $x+1$, $x-2$, and $x+3$.

(5) What is meant by the power of a quantity, and what by a root?

STAGE II.

(1) Find the L.C.M. of $4(a^2+ax)$, $12(ax^2-x^3)$, and $18(a^2-x^2)$.

(2) Find the value of x in the following:—

$$\frac{3x-4}{7}-\frac{x-17}{2}=6\tfrac{1}{2}.$$

(3) Simplify $\frac{1}{a-b}-\frac{2b}{a^2-b^2}+\frac{1}{a+b}$

(4) Divide £36 between A and B so that B's share may be $3\frac{1}{2}$ times A's share.

(5) Multiply $\frac{x-a}{(x-a)^2}$ by $\frac{x^2-a^2}{x^2+a^2}$

Answers: I. (1) $2a-b-c$. (2) $-x-4=-6$. (3) x^2-px+q. (4) x^3+2x^2-5x-6. (5) If a given quantity is multiplied by itself any number of times, the result is called a power of the given quantity. Thus $a\times a=a^2$ is the second power of a; $a\times a\times a=a^3$ is the third power, and so on. a is called the first power. A root of a given quantity is such a quantity that if multiplied by itself an indicated number of times it would produce the given quantity. Thus a is a root of a^2, and of a^3; of a^2 it is the square root, of a^3 it is the cube root.

II. (1) $36ax^2(a^2-x^2)$. (2) 20. (3) $\frac{2}{a+b}$

(4) A £8, B £28. (5) $\frac{x+a}{x^2+a^2}$

* * *

Pupil Teachers' Preparation Papers.

THE following is a test paper for the pupil teachers whose year ends in April. It covers about half the year's work. Every pupil teacher should try the paper within the time specified. A goodly and increasing number of the October teachers availed themselves of our offer to examine, correct and revise their papers. We renew the offer. Head teachers wishing to get an independent opinion of the work of their pupil teachers, and a judgment based upon comparison with the work of teachers throughout the country; or pupil teachers working the questions at home, will have their papers returned post free by the end of November if they will forward their answers with a postal order for one shilling to the Editor of *The Practical Teacher*, 4, Pilgrim Street, Ludgate Hill, London, E.C., by the 10th of the month.

HALF YEARLY TEST PAPER FOR PUPIL TEACHERS WHOSE YEAR ENDS IN APRIL.

Directions.

1. Write on half sheets of foolscap, and on one side only.
2. At the top of each half sheet write your name in full, the full address of your school, and the year the papers of which you are taking.
3. Do not write the questions, but prefix to each answer the number of the question to which it corresponds.
4. Do not use any book or writing from which answers may be copied.
5. Keep strictly to the time allowed.
6. If you have not time to answer all the questions, choose those you can answer best; but do not omit the whole of any one subject.
7. If you wish them examined, corrected, and valued, send them to the office of the 'PRACTICAL TEACHER,' Pilgrim Street, Ludgate Hill, together with a shilling postal order, not later than the 10th November. They will be returned post free.

END OF FIRST YEAR.

(Three and a half hours allowed.)

Arithmetic.

(Do three questions only, including question 4, if you can.)

MALES ONLY.

1. Define clearly.—*Vulgar Fraction, Mixed Fraction, Proper Fraction, Improper Fraction.* Give examples of each, and classify these fractions in the order of their magnitude:— $\frac{3}{8}$, $\frac{9}{16}$, $\frac{13}{27}$, $\frac{19}{36}$. (30)

2. Find the G.C.M. of 218,484 and 73,170, and the L.C.M. of 20, 27, 28, 35, 45 and 63. (30)

3. Reduce 2½ guineas to the fraction of £1¾, and express 3 roods 15 poles as the fraction of an acre. (30)

4. One ounce Troy of gold is worth £3 17s. 10½d.; find the value of a ton of gold. (40)

FEMALES ONLY.

1. Find the cost of 3 acres, 1 rood, 3 poles, 19¼ sq. yds. of land at £110 per acre. (30)

2. Find by practice the cost of 2,510 lambs at 14s. 7¼d. each. (30)

3. Coal is bought at 24s. per ton and sold for 25s. 6d.; how many tons must be sold per year to realize an income of £350? (30)

4. A Bill:—10¼ yds. ribbon at 2¼d. per yd., $13\frac{11}{16}$ yds. of calico at 8d. per yd., 106 reels of cotton at 8d. per doz., 10 pieces of tape at 2¾d. per piece and one umbrella at 10s. 6d. (40)

Geography.

MALES AND FEMALES.

(Answer three questions only.)

1. Draw a map of the six northern counties of England, *or* of Ireland. Insert parallels and meridians. (30)

2. 'England is the chief commercial country of the world.' Prove this, and give a list of the chief English ports, with particulars of their trade. (25)

3. Name the chief agricultural districts of England and Wales, and say what are the chief crops of each. (25)

4. 'England is a well-watered country.' How would you show this to a class? Trace the course of any English river. (25)

Grammar.

(Answer questions 1 and 2, and one other question.)

We buried *him* darkly at *dead of* night,
The *sods* with our bayonets *turning*,
By the struggling *moonbeam's misty light*,
And the *lantern dimly burning.*

1. Analyse the above four lines. (25)

2. Parse the words in italics. (35)

3. Give six examples of the endings of English abstract nouns, with examples. Say out of what kind of words the nouns are formed. (20)

4. What is meant by *relative pronoun, antecedent, reflexive pronoun, passive voice,* and *abstract noun?* Give examples of these, and write sentences containing them. (20)

Composition.

(Read the following story once only, and then write it from memory.)

When Agrippa was in a private station he was accused by one of his servants of having spoken injuriously of Tiberius, and was condemned by the Emperor to be exposed in chains before the palace gate. The weather was very hot, and Agrippa became exceedingly thirsty. Seeing a servant of Caligula pass by with a pitcher of water, he called to him and entreated leave to drink. The peasant presented the pitcher with much courtesy, and Agrippa, having allayed his thirst, said to him, 'Assure thyself that if I get out of this captivity I will one day pay thee well for this glass of water.' Tiberius dying, his successor soon after not only set Agrippa at liberty, but made him king of Judæa. In this high situation Agrippa was not unmindful of the glass of water given to him when a captive. He immediately sent for his benefactor, and made him comptroller of his household. (40)

History.

(Answer three questions only.)

1. Who were the Ancient Britons, Romans, Picts and Scots, Danes, Jutes, Saxons, and Angles? Give dates of the coming of these to England. (25)

2. Write a brief description of the chief Roman works in Britain. What remains of their occupation may still be found, and where? (25)

3. Name any of the leaders of the Saxon or British tribes, and give a short description of four of them. (30)

4. What historical events of the period of history you are studying are connected with the Tyne and Solway, the Forth and Clyde, the Grampians, Ethandune, Athelney, York? (25)

END OF SECOND YEAR.

FIRST PAPER.

(Three and a half hours allowed.)

Euclid.

MALES ONLY.

(Answer two questions, including question 3, if you can.)

1. Write out Euclid, Book I., Prop. 5. (20)

2. If a side of a triangle be produced the exterior angle is greater than either of the interior opposite angles. (20)

3. Enunciate the Seventh proposition of the First Book of Euclid. Draw the figures for the three cases, and say why the third case needs no demonstration. (30)

Grammar.

MALES AND FEMALES.

(Answer Questions 1 and 2, and one other question.)

'*Let* us *beware that* our rest becomes not the *rest* of stones which, *so long as* they are torrent-tossed and *thunder-stricken*, maintain their majesty, but when the stream is *silent* and the storm *passed*, suffer the grass *to cover* them, and the *lichen* to feed on them, and *are ploughed down* to dust.'—*Ruskin.*

1. Analyse the above passage. (30)

2. Parse the words in italics. (30)

3. Paraphrase the passage. (20)

4. Write a composition on the 'Moods of Verbs.' (20)

Geography.

(Answer three questions only.)

1. Draw a full map of Spain and Portugal *or* Sweden and Norway. (30)

2. Name the principal European rivers. Describe fully the course of the Danube, the Rhine, or the Rhone. (25)

3. Describe fully the physical features of France or Italy. (25)

4. Where and what are—Lyons, Geneva, Basel, Metz, St. Etienne, Badajos, Douro, Mansanares, Maladetta, Matterhorn. (25)

SECOND PAPER.

(Two hours and a half allowed.)

[Needlework for girls takes one hour.]

Arithmetic.

MALES ONLY.

(Do three sums only.)

1. In what time will £244 1s. 8d. amount to £253 4s. 8¾d. at 3 per cent. simple interest? (30)

2. Find to the nearest farthing the compound interest on £450 6s. 8d. for two years at 2 per cent., interest being payable half-yearly. (30)

3. Two friends during a walk take steps of $2\frac{22}{40}$ and $2\frac{33}{58}$ feet respectively. If they start in step, how far will they have walked before they are in step again, and how many steps will each have taken? (30)

4. The annual consumption of brandy in a country is 450,000 gallons, and the duty is 9s. 2d. per gallon; duty is reduced 6 per cent., and the consumption then increases 8 per cent.; how is the revenue affected? (40)

FEMALES.

(*Answer the Questions set for* FIRST YEAR MALES.)

History.

(*Answer three questions only.*)

1. What were the Crusades? Give a full account of the connection of any of our English kings with them. (25)

2. State the chief provisions of Magna Charta, and say how it was obtained. (30)

3. Give the chief events of the reign of Henry III. (25)

4. What were—The Domesday Book, Curfew, New Forest, Feudal System? (25)

Teaching.

(*Answer two questions only.*)

1. Explain as to a Third Standard the meaning of the following Old English proverbs:—

'Good beginning makes good ending.'
'Ill weeds grow apace.'
'A stout heart is worth more than a steel blade.' (20)

2. Describe your method of giving a reading lesson. Give the reasons for adopting your method. (20)

3. What plan do you adopt in the Infant Class to teach the children to spell? (20)

4. What use do you make of the blackboard in teaching children to write? What are the advantages of head-line copy-books? (20)

END OF THIRD YEAR.

FIRST PAPER.

(*Three hours and a half allowed.*)

Euclid.

MALES ONLY.

(*Answer two questions only, including question 3 if you can.*)

1. Write out the two corollaries to the thirty-second proposition of Euclid, Book I. (20)

2. The straight lines which join the extremities of equal and parallel straight lines are themselves equal and parallel. (20)

3. Find a point in the base of a triangle such that if straight lines be drawn from it parallel to the sides of the triangle and terminated by them, they shall be equal. (30)

Algebra.

MALES ONLY.

(*Answer two questions only.*)

1. Evaluate the following expressions when $a = 9$ and $x = 7$.

$$(1)\ 14a - [a - 5\ \{a + 3\ (a - x)\}\ ]$$

$$(2)\ \sqrt{\frac{a^3 - x^3 - 3ax\ (a - x)}{a - x}}. \quad (25)$$

2. From $5\ [(a - b) - (c + d)]$ take $2\ [2\ (a + b) - 3\ (c - d)]$. (25)

3. Add together the following quotients:—

$$\frac{9m^2 - n^2}{3m - n} \cdot \frac{m^2 + 5mn + 6n^2}{m + 2n} \cdot \frac{m^2 - 16n^2}{m + 4n} \cdot \frac{m^2 - mn - 12n^2}{n - 4n}. \quad (25)$$

4. Show that $x\ (x + 1)\ (x + 2)\ (x + 3) + 1 = (x^2 + 3x + 1)^2$. (25)

Mensuration.

MALES ONLY.

1. Calculate by duodecimals the area of a rectangle whose sides are 8 ft. 9 in. 10 pts. and 5 ft. 6 in. 7 pts. (20)

2. Each side of a rhombus is 120 yards, and one of its angles is 60°. Find the area of the rhombus in acres to two decimal places. (20)

Arithmetic.

FEMALES ONLY.

1. Find the value of ·2272 of £14 6s. $5\frac{1}{2}$d. (30)

2. What decimal is equal to

$$\frac{1\frac{1}{8}}{1\frac{3}{4}} \div \left\{\left(\frac{3}{17} \times 1\frac{1}{2}\right) - \frac{1}{18\frac{3}{8}}\right\} \quad (40)$$

3. Multiply 21·945 by ·0508 and divide ·68921 by ·0041 (30)

4. On a railway there are 30 telegraph posts to a mile. If a train passes 17 of these in a minute, at what rate per hour is it travelling? (30)

Grammar.

MALES AND FEMALES.

(*Answer questions 1 and 2, and one other question.*)

1. Paraphrase the following passage:—

Like a morning *breeze*,
Which blows in summer from the gates of dawn
Across the fields of spice, and *wakes* to life
Their *slumbering* perfume through this silent land
Of whispering voices and of *half closed* eyes,
Where scarce a footstep sounds, *nor* any *strain*
Of earthly song—*thou cam'st*.—MORRIS.

2. Analyse it and parse the words in italics.

3. 'Only transitive verbs have a passive voice.' Explain this. Is there any exception to the rule? If so, give examples.

4. What is a *derivative?* How are many of our words formed? Give a list of a dozen words, each having a different Latin prefix. State their meaning, and, if possible, how they are formed.

Geography.

MALES AND FEMALES.

(*Answer three questions, including question 1.*)

1. Draw a map of the basin of the Ganges, the Eastern coast of Asia, or of Siberia. Insert parallels and meridians if possible. (30)

2. What are the chief countries of Asia? Give their capitals, the rivers on which they stand, and state anything you can about the towns. (25)

3. Describe with full particulars the mountain system of Asia. (25)

4. Give a description of the climate, the productions, and the people of China, Japan, Arabia, Western Africa, Egypt, or Southern Africa. (25)

SECOND PAPER.

(*Two hours and a half allowed.*)

[Needlework for Females. *One hour.*]

Arithmetic.

MALES ONLY.

(*Answer three questions only.*)

1. The 3 p.m. express from Paddington to Exeter stops first at Swindon, $77\frac{1}{2}$ miles distant, at 4.27 p.m. The whole journey is 194 miles, and 15 per cent. of the time is expended in stoppages. At what time is the train due at Exeter? (30)

2. A person has £5,000 stock in the 3 per cents., which he sells out and invests in the 3 per cents. at $87\frac{1}{2}$, thus increasing his income by £5. Find the price of the 3 per cents. (30)

3. Find the present value of £808 1s. 4d. due 3 years and 9 months hence, at 4 per cent. per annum, simple interest. (30)

4. Give the formulæ for finding the fourth when any three of the following are given:—rate, time, principal, interest.

Find the compound interest on £1256 10s. for 2 years, at $3\frac{1}{2}$ per cent. (40)

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. What events led to the revolution in 1688? Give dates and particulars of the revolution. (25)

2. What circumstances led to the formation of a National Debt in England? During what years or periods was it largely increased? Why? (25)

3. Make a genealogical table of the Houses of Stuart and Hanover. Say what claim the latter had to the throne of England. (25)

4. Give some account of the chief writers and soldiers of the reigns of William and Anne. (30)

Teaching.

MALES AND FEMALES.

(*Answer two questions only.*)

1. Write full notes of *matter* for a lesson on Adverbs; A River; Mountains; *or*, An Apple (for Infants). (20)

2. What apparatus would you use in giving a lesson on a River to the Second Standard? Explain the use of each part of the apparatus. (20)

3. What is an Abacus? How do you use it? (20)

4. Of what value is Mental Arithmetic?
How often should lessons be given in it? When? (20)

END OF FOURTH YEAR.

FIRST PAPER.

(*Three and a half hours allowed.*)

Euclid.

MALES ONLY.

(*Answer two questions, including No. 3, if you can.*)

1. If a straight line be divided into any two parts, the squares on the whole line and on one of the parts are equal to twice the rectangle contained by the whole and that part, together with the square on the other part. (20)

2. If a straight line be divided into any two parts, the square on the whole line is equal to the squares on the two parts, together with twice the rectangle contained by the parts. (20)

3. The square on the excess of one straight line above another is less than the squares on the two lines by twice their rectangle. (30)

Algebra.

(*Answer two questions, including Question 3, if you can.*)

1. Reduce to its lowest terms :—

$$\frac{x^3 + 2x^2 - 8x - 16}{x^3 + 3x^2 - 8x - 24}$$

Find the L.C.M. and G.C.M. of
$6a^3 + a^2b - 11ab^2 - 6b^3$; and $6a^3 + 11a^2b - ab^2 - 6b^3$. (20)

2. There is a number such that the square of the next higher number exceeds the square of the next lower number by 120. Find the number. (20)

3. Solve the equations :—

(*a*) $\cdot 6x - \frac{\cdot 09x - \cdot 05}{\cdot 5} = \cdot 2x + 8\cdot 9$.

(*b*) $2x + 7y = 13$; $6y - 5x = 38$. (30)

Mensuration.

(*Answer one question.*)

1. The radius of a circular arc is 2 ft. 11 in.; find the length of its chord. (20)

2. A rule to find the weight of a solid iron ball is :

> 'Multiply the cube of the diameter expressed in inches by 9 and divide by 64; the result will give the weight required in pounds.'

Assuming the truth of the above rule, find the weight in ounces of a cubic foot of iron. (20)

Arithmetic.

FEMALES ONLY.

(*Answer three questions only.*)

1. Find the amount of £200 16s. 8d. in 2¾ years at 3½ per cent. simple interest. (30)

2. The debts of a bankrupt amount to £2,016, and his assets to £1,764; how much do his creditors lose in the pound? (30)

3. A merchant gains 30 per cent. on one-third of his capital, 45 per cent. on one-fourth, and loses 15 per cent. on the remainder; what is his gain per cent. on the whole capital. (40)

4. If four men mow 15 acres in 10 days of 7 hours each, in how many days of 6½ hours can 7 men mow 19½ acres? (30)

Grammar.

MALES AND FEMALES.

(*Answer questions 1 and 2, and two other questions.*)

1. 'He stood *as erect as that* tent *prop, both arms stretched out wide*
On the great cross-support in the centre, *that* goes to *each* side.' *R. Browning.*

Analyse the above passage. (20)

2. Parse the words in italics. (20)

3. What classes of words in the English language are Saxon? Give a full answer. (20)

4. Explain nominative absolute, nominative of address, nominative in apposition; passive voice; complementary predicate; complex sentence. (20)

5. Name any three great writers of English poetry, and write a short biography of one of them. (20)

Geography.

(*Answer three questions only.*)

1. Why is the Atlantic coast of North America colder than the Pacific coast? (25)

2. Describe the great lakes of North America. (25)

3. What sort of a climate has Brazil? Why? Name the chief physical features of Brazil. (25)

4. What are monsoons? Where are they found? What other winds do you know anything of? (25)

SECOND PAPER.

Two hours and a half allowed.

[Needlework for Females. *One hour.*]

Arithmetic.

MALES.

(*Answer three questions only.*)

1. At what time between 3 and 4 o'clock is the minute hand of a watch at right angles to the hour hand? (30)

2. A square field contains 2½ acres. The cost of making a path is 1s 6d. per sq. yard. What is the cost of making a path three yards wide inside the field round the boundary? (30)

3. What rate of interest per annum does a man get for his money when in discounting a bill due in 10 months he deducts as discount 4 per cent. of the total amount of his bill? (30)

4. Define *Stocks*, *Consols*, and *Annuities*.
I invest equal sums in a Four per Cent. Stock, and in a Three per Cent. Stock, and get 5 per cent. for my money; the Four per Cents. are at 90; what is the price of the Three per Cents.? (40)

History.

MALES AND FEMALES.

(*Answer three questions only.*)

1. Write an account of the acquisition and loss of English possessions in France. (25)

2. What kings of England suffered a violent death? What kings were deposed? (25)

3. Give a full account of the Reform Bill of 1832. (25)

4. What led to the Peninsular War? Who were engaged in it? What were the chief engagements, with dates? (30)

Teaching.

(*Answer two questions only.*)

1. Write notes of a lesson on The Tides; The Moon; Ocean Currents. (20)

2. Name and classify some of the difficulties of English spelling, with examples. Show how you overcome the difficulties in the class. (20)

3. How do you teach writing? Compare the advantages and disadvantages of the use of head-line copybooks. (20)

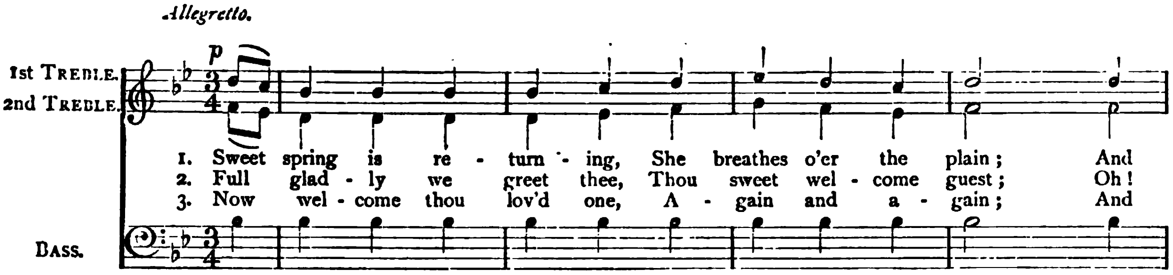
FOR TEACHERS IN INFANT SCHOOLS.

1. Write full notes of a lesson on The Apple; The Bear; *or* A Letter. (20)

2. Describe a lesson in paper folding. (20)

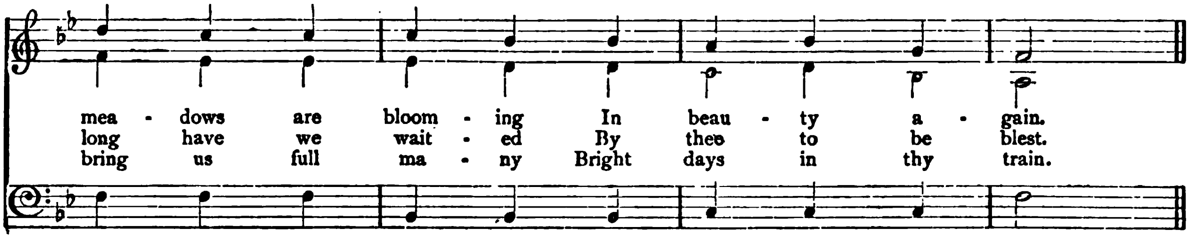
3. How do you teach reading? (20)

SPRING.

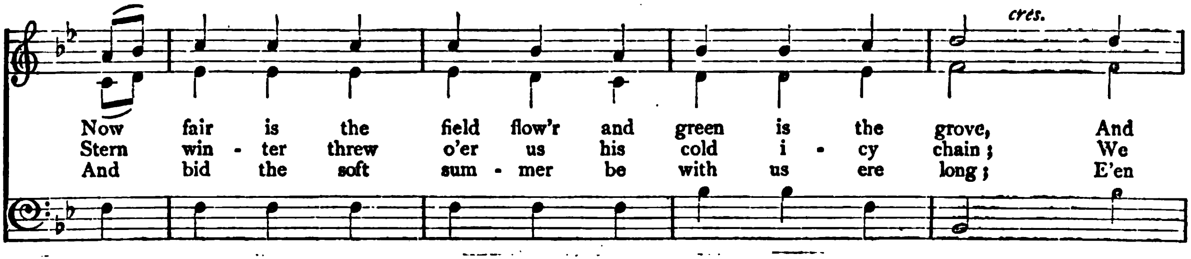

Allegretto.
p
1st TREBLE.
2nd TREBLE.
BASS.
1. Sweet spring is re - turn - ing, She breathes o'er the plain; And
2. Full glad - ly we greet thee, Thou sweet wel - come guest; Oh!
3. Now wel - come thou lov'd one, A - gain and a - gain; And

KEY B♭. *Allegretto.* *p*

1st TREBLE.	:m .r	d :d :d	d :r :m	f :m :r	m :— :m
2nd TREBLE.	:s, .f,	m, :m, :m,	m, :f, :s,	l, :s, :f,	s, :— :s,
BASS.	:d	d :d :d	d :d :d	d :d :d	d :— :d

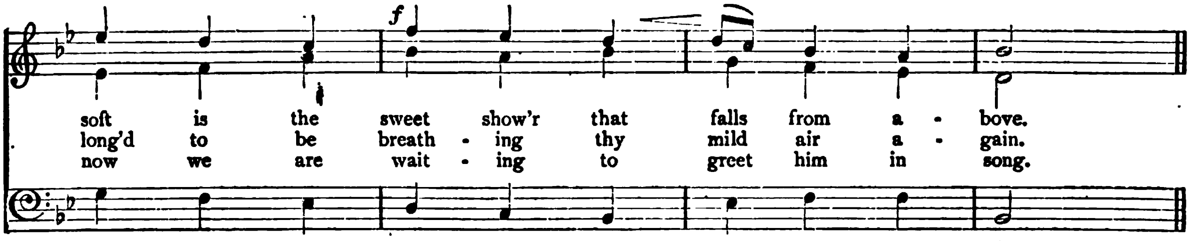

mea - dows are bloom - ing In beau - ty a - gain.
long have we wait - ed By thee to be blest.
bring us full ma - ny Bright days in thy train.

m :r :r	r :d :d	t, :d :l,	s, :—
s, :f, :f,	f, :m, :m,	r, :m, :d,	t₂ :—
s, :s, :s,	d, :d, :d,	r, :r, :r,	s, :—


cres.
Now fair is the field flow'r and green is the grove, And
Stern win - ter threw o'er us his cold i - cy chain; We
And bid the soft sum - mer be with us ere long; E'en

cres.

:t, .d	r :r :r	r :d :t,	d :d :r	m :— :m
:r, .m,	f, :f, :f,	f, :m, :r,	m, :m, :f,	s, :— :s,
:s,	s, :s, :s,	s, :s, :s,	d :d :s,	d, :— :d


f
soft is the sweet show'r that falls from a - bove.
long'd to be breath - ing thy mild air a - gain.
now we are wait - ing to greet him in song.

	f		
f :m :r	s :f :m	m .r :d :t,	d :—
f, :s, :t,	d :t, :d	l, :s, :f,	m, :—
l, :s, :f,	m, :r, :d,	f, :s, :s,	d, :—

Knitting Maps.

BY MRS. J. D. HARRIS.

NEW AND WELL-FITTING HEEL FOR STOCKING.

This new heel is a great improvement on the old-fashioned ones. By the insertion of the little gusset at the back, the actual shape of the foot is followed, and, more play being allowed, the wool is less stretched, and consequently wears much better.

We will suppose the sock or stocking reduced at the ancle to 81 stitches. Put 42 on the instep pin, 18 each side the seam stitch on the heel pin.

To commence the Heel.

A. Knit 17. Pick up a loop. (This loop should be the stitch of the last round. By increasing in this way you avoid making a hole.) Knit 1, seam 1, knit 1. Pick up a loop. Knit 17.

Purl the reverse row.

B. The same as A.

C. Ditto.

Now knit backwards and forwards till you have 10 loops at the side.

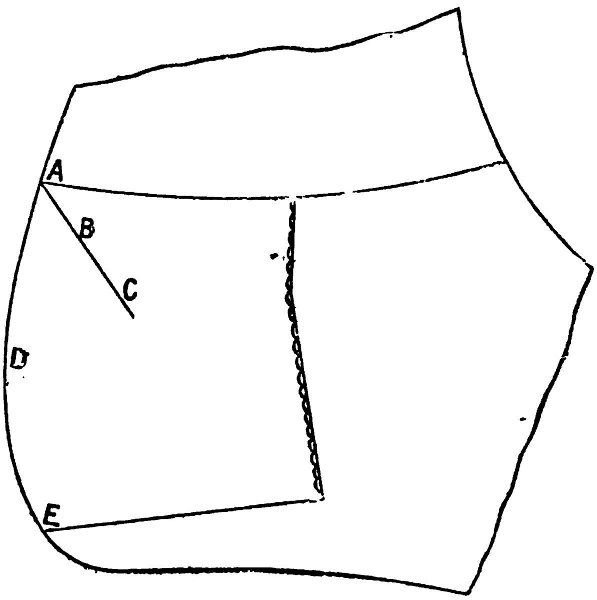
To Round the Heel.

D. Reduce once each side the seam stitch on the right side till you have only 29 stitches on the pin.

To Turn the Heel.

E. Purl 17. Purl 2 together. Turn the pin. Knit 6. Knit 2 together. Turn the pin. Purl 6. Purl 2 together.

When all the stitches are taken up, pick up 18 loops, add 4 from the instep pin. The same the other side.



Query Column.

RULES.

1. **Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.**

2. **No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.**

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. **Correspondents are requested to write their queries *legibly*, and on one side of the paper only.**

5. **Replies will not be sent through the post.**

6. **Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.**

⁂ **All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.***

General.

1. STUDENT.—The solution of your query appeared in our issue for July.

2. J. W. G.—Yes he was right in refusing a labour certificate to a boy who had only passed in two out of the three subjects required in Standard IV. The authority for this is of course the code. If you refer to Article 102, you will find that certificates are given to those who *reach* the standard. But to reach a standard is defined to be passing in reading, writing, and arithmetic, that is, in the three R's.

3. H. MELLOR.—You cannot do better than use Hygiene, by Dr. Carpenter, supplementing your reading as therein directed, if you want to extend it.

4. STUDENT.—(1) Your query is evidently incorrect. If both paid ready money, the stationer would gain $\frac{1}{9}$ of 100, or $11\frac{1}{9}$ per cent. As he is allowed longer credit than the retail customer, his profit must therefore be greater; but the answer sent is less. Will you kindly forward your query again? (2) Many thanks for the solution sent.

5. X.—Yours and some others next month.

6. E. S. L. M.—See Rule 2 of the Query Column.

7. A. THORNTON.—Your query is under consideration, but it seems like proving an abstract quantity equal to a concrete quantity.

8. COUNTRY.—Your case is important, and we therefore refer you to the new Science and Art Directory, page 30, where it says, 'In order to obtain payment on the result of instruction in a subject of science, a teacher must have obtained a *first* class in the May examinations, or what is reckoned as equivalent by the Department? You must get a first class. It is only reasonable that teachers should keep abreast of the times. All who want to teach must be anxious to learn.

9. LENN.—We will enquire further. The hoods are noticed in many almanacs and books of reference.

10. SUBSCRIBER.—Second year men will not have to take mental arithmetic. The writing is only poor, exhibiting many faults in short space. You have not practised in the way we always recommend, and you ought not to be disappointed. The small hand is a little better. 60 per cent. and 70 per cent. respectively.

11. MECHANIC.—A vessel contains mercury, and over the mercury 10 inches depth of water. Find to one decimal place the pressure on a square inch at the following depths below the surface of the water.

(1) Six inches.

(2) One foot.

(3) Three feet; having given 1 foot = 1000 ounces; pressure 15 lbs. on a square inch, the density of mercury $13\frac{1}{2}$ times that of water. (*Blackie's* 'Mechanics.')

Consider that the total pressure is the sum of the separate pressures.

In the first case the pressure of the air is 15 lbs. per sq. in.
And the pressure of the water is $\frac{6}{1728} \times \frac{1000}{16} = \cdot 2$,, ,,
Total 15·2 ,, ,,

In the second case the pressure of the air is 15 ,, ,,
The pressure of the water is $\frac{10}{1728} \times \frac{1000}{16}$

,, ,, mercury is $= \frac{2 \times 13\frac{1}{2}}{1728} \times \frac{1000}{16}$

The pressure of water and mercury

$= \frac{37}{1728} \times \frac{1000}{16} =$ 1·3 lbs. per sq. in.

∴ The total pressure = 16·3 ,, ,,

In the third case the pressure of air is 15 ,, ,,

That of the water and mercury together

$$= \frac{26 \times 13\frac{1}{2} + 10}{1728} \times \frac{1000}{16}$$

$$= \frac{361}{1728} \times \frac{1000}{16} = 13 \cdot 1$$

∴ Total = 28·1 lbs. per sq. in.

12. H. B.—A body projected horizontally from the top of a cliff with a velocity of 40 feet per second strikes the ground after 3 seconds; find the distance of the point of fall from the point of projection. (*Magnus.*)

$$\begin{aligned} \text{Distance} &= \sqrt{(40 \times 3)^2 + (\tfrac{1}{2}\,f\,t^2)^2} \text{ ft.} \\ &= \sqrt{120^2 + (16 \times 9)^2} \text{ ft.} \\ &= \sqrt{14400 + 20736} \text{ ft.} \\ &= \sqrt{35136} \text{ ft.} \end{aligned}$$

$$\begin{array}{r|l} & 3'51'36\,(187{\cdot}44 \\ & 1 \\ \hline 28 & 251 \\ & 224 \\ \hline 367 & 2736 \\ & 2569 \\ \hline 3744 & 16700 \\ & 14976 \\ \hline 37484 & 172400 \\ & 149936 \\ \hline & \underline{22464} \end{array}$$

$= \underline{187{\cdot}44\ldots\ldots}$ ft. Ans.

Algebra.

1. COMPOS.—When $3\frac{1}{5}$ per cent. is the rate of interest, find what sum must be paid now to receive a freehold estate of £320 a year 10 years hence; having given

$$\log 1{\cdot}032 = \cdot 0136797,$$
$$\log 7{\cdot}29798 = \cdot 8632030. \qquad (\textit{Todhunter.})$$

Sum $= \frac{AR^{-p}}{R - 1}$, (where A = annuity, R = the amount of one pound in one year, and p = time when annuity commences.)

$$= \frac{320\left(1 + \frac{3\frac{1}{5}}{100}\right)^{-10}}{\frac{3\frac{1}{5}}{100}}$$

$$= 320 \times \tfrac{500}{16}\,(1{\cdot}032)^{-10}$$
$$= 10000\,(1{\cdot}032)^{-10};$$

$$\begin{aligned} \therefore \text{Log sum} &= \log 10000 - 10 \log 1{\cdot}032 \\ &= 4 - (\cdot 0136797 \times 10) \\ &= 4 - \cdot 136797 \\ &= 3{\cdot}863203 \\ &= \log 7297{\cdot}98; \end{aligned}$$

∴ Sum = £7,297·98. Ans.

2. OSBORNE.—Write down the coefficient of x^{2r+1} in the expansion of $\left(x - \frac{1}{x}\right)^{2n+1}$. (*Todhunter.*)

$$\left(x - \frac{1}{x}\right)^{2n+1} = \frac{(x^2 - 1)^{2n+1}}{x^{2n+1}};$$

The coefficient of x^{2r+1} is the same as that of $x^{2r+1+2n+1}$ in the expansion of $(x^2 - 1)^{2n+1}$, and this is the same as the coefficient of y^{n+r+1} in the expansion of $(y - 1)^{2n+1}$.

In the expansion of $(x + a)^p$, the $(q + 1)$th term

$$= \frac{p\,(p-1)\,(p-2)\ldots\ldots(p-q+1)}{\underline{|q}}\,x^{p-q}\,a^q,$$

Multiplying numerator and denominator by $\underline{|p-q}$,

$$= \frac{\underline{|p}}{\underline{|q}\;\underline{|p-q}}\,x^{p-q}\,a^q;$$

Now let us take the expression $(y - 1)^{2n+1}$, of which we wish to find the term involving y^{n+r+1};

By substitution—

$$p = 2n + 1,$$
$$p - q = n + r + 1,$$

∴ By subtraction : $q = n - r$,

And $a = -1$;

$$\therefore \text{Coefficient } \frac{\underline{|p}}{\underline{|q}\;\underline{|p-q}}\,a^q$$

$$\text{becomes } \frac{\underline{|2n+1}}{\underline{|n-r}\;\underline{|n+r+1}}\,(-1)^{n-r}.$$

3. E. N.—Find the rth term of the expression $(a + x)^{\frac{1}{3}}$. (*Hamblin Smith.*)

The rth term of $(a + x)^{\frac{1}{3}}$

$$\begin{aligned} &= \frac{n\,(n-1)\,(n-2)\ldots\ldots(n-r+2)}{\underline{|r-1}}\,a^{n-(r-1)}\,x^{r-1} \\ &= \frac{\frac{1}{3}\,(\frac{1}{3}-1)\,(\frac{1}{3}-2)\ldots\ldots(\frac{1}{3}-r+2)}{\underline{|r-1}}\,\frac{a^{\frac{1}{3}}}{a^{r-1}}\,x^{r-1} \\ &= \frac{\frac{1}{3}\,.\,-\frac{2}{3}\,.\,-\frac{5}{3}\ldots\ldots-\frac{3r-7}{3}}{\underline{|r-1}}\left(\frac{x}{a}\right)^{r-1}a^{\frac{1}{3}} \\ &= \frac{(-1)^{r-2}\,(\frac{1}{3})^{r-1}\,.\,1\,.\,2\,.\,5\ldots\ldots 3r-7}{\underline{|r-1}}\left(\frac{x}{a}\right)^{r-1}a^{\frac{1}{3}} \\ &= \frac{1\,.\,2\,.\,5\ldots\ldots 3r-7}{\underline{|r-1}}\,(-1)^{r-2}\left(\frac{x}{3a}\right)^{r-1}a^{\frac{1}{3}}. \end{aligned}$$

Arithmetic.

1. JEAN.—A man aged 45 has a pension of £300 a year during his own life; he wishes to exchange it for another to continue not only during his life, but that of his wife, aged 40. What will be this pension reckoning compound interest at 5 per cent.?

This question is taken from Chambers' Arithmetic, and the following solution is given in the key.

$$\text{Pension} = \frac{a_{45} \times 300}{a_{45} + a_{40} - a_{40\cdot 45}};$$

From Table 6 (page 274), 5 per cent. column—
Value of £1 on a single life at 40 is 13·390,
,, ,, 45 ,, 12·648;

From Table 7 (page 275), for two lives at 5 per cent.—for 40 and 45 (look at 45)—
Value of £1 is 10·598.

Working now from formula above,

$$\begin{aligned} \text{Pension} &= \frac{a_{45} \times 300}{a_{45} + a_{40} - a_{40\cdot 45}} \\ &= \frac{12{\cdot}648 \times 300}{12{\cdot}648 + 13{\cdot}390 - 10{\cdot}598}\,£ \\ &= \frac{3794{\cdot}4}{26{\cdot}038 - 10{\cdot}598}\,£ \\ &= \frac{3794{\cdot}4}{15{\cdot}44}\,£ \\ &= \underline{£245\ 15s.\ 0\tfrac{1}{4}d.} \text{ Ans.} \end{aligned}$$

2. **FOLKESTONIAN.**—Simplify

$$\frac{2 \times \sqrt{1+\frac{1}{3}} \div \sqrt{1-\frac{1}{5}}}{5 \times \sqrt{1+\frac{1}{3}} \times \sqrt{1-\frac{1}{5}}}$$

First Method.—

$$\frac{2 \times \sqrt{1+\frac{1}{3}} \div \sqrt{1-\frac{1}{5}}}{5 \times \sqrt{1+\frac{1}{3}} \times \sqrt{1-\frac{1}{5}}}$$

$$= \frac{2 \times \sqrt{\frac{4}{3}} \div \sqrt{\frac{4}{5}}}{5 \times \sqrt{\frac{4}{3}} \times \sqrt{\frac{4}{5}}}$$

$$= \frac{2 \times \sqrt{\frac{\cancel{4}}{3} \times \frac{5}{\cancel{4}}}}{5 \times \sqrt{\frac{4}{3} \times \frac{4}{5}}}$$

$$= \frac{2 \times \sqrt{\frac{5}{3}}}{5 \times \sqrt{\frac{16}{15}}}$$

$$= \frac{2}{5} \times \sqrt{\frac{5}{3} \times \frac{\cancel{15}\,5}{16}}$$

$$= \frac{2}{5} \times \sqrt{\frac{25}{16}}$$

$$= \frac{\cancel{2}}{\cancel{5}} \times \frac{\cancel{5}}{\underset{2}{\cancel{4}}}$$

$$= \frac{1}{2}. \quad \text{Ans.}$$

Second Method.

$$\frac{2 \times \sqrt{1+\frac{1}{3}} \div \sqrt{1-\frac{1}{5}}}{5 \times \sqrt{1+\frac{1}{3}} \times \sqrt{1-\frac{1}{5}}}$$

(Dividing numerator and denominator by $\sqrt{1+\frac{1}{3}}$)

$$= \frac{2 \div \sqrt{\frac{4}{5}}}{5 \times \sqrt{\frac{4}{5}}}$$

$$= \frac{2}{5 \times \sqrt{\frac{4}{5} \times \frac{4}{5}}}$$

$$= \frac{2}{5 \times \frac{4}{5}}$$

$$= \frac{2}{4}$$

$$= \frac{1}{2}. \quad \text{Ans.}$$

3. **PERPLEXED.**—A tradesman increased his estate annually a third part, abating £100 which he spent on his family, and at the end of $3\frac{1}{4}$ years he found that he was worth £3,179 11s. 8d.; how much had he at the beginning? (*Gray's* 'Arithmetic.')

Gain in a year = $\frac{1}{3}$ of capital,
Amount at end of year = $\frac{4}{3}$ of capital,
∴ Capital = $\frac{3}{4}$ of amount at end of year.
Gain in $\frac{1}{4}$ year = $\frac{1}{4}$ of $\frac{1}{3}$ of capital
= $\frac{1}{12}$ of capital,
Amount at end of $\frac{1}{4}$ year = $\frac{13}{12}$ of capital,
∴ Capital = $\frac{12}{13}$ of amount at end of $\frac{1}{4}$ year.

£ s. d.
3179 11 8 = Amount at end of $3\frac{1}{4}$ years
12
13)38155 0 0
£2935
25 = Expenses for $\frac{1}{4}$ year
2960 = Amount at end of 3 years
3
4)8880
£2220
100 = Expenses for a year
£2320 = Amount at end of 2 years
3
4)6960
1740
100 = Expenses for a year
1840 = Amount at end of a year
3
4)5520
1380
100 = Expenses for a year
£1480 = Amount at the beginning.

4. **N. S. G. H.**—The interest on a certain sum of money for a certain time is £28, and the discount on the same sum for the same time is £21 17s. 6d. Find the sum. (*Hamblin Smith.*)

The difference between the simple interest and the discount is the simple interest on the discount.

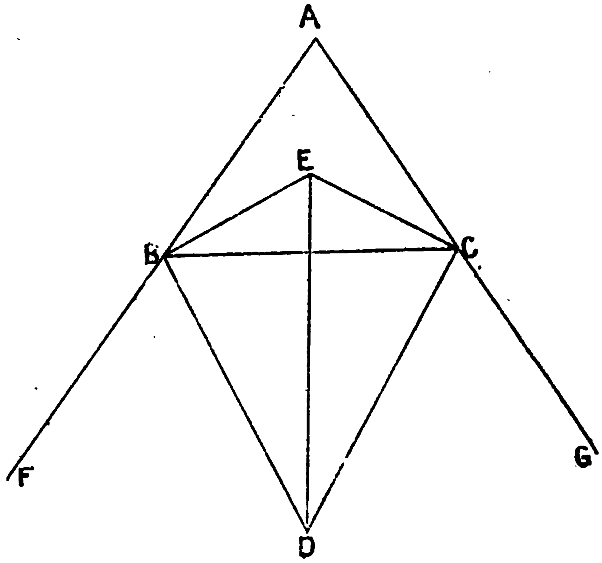
Difference = £28 − £21 17s. 6d.
= £6 2s. 6d.;

$$\begin{array}{cccccc} & \pounds & & \pounds & & \pounds & \\ \therefore & 6\frac{1}{8} & : & \cancel{28} & :: & 21\frac{7}{8} & : \text{Sum.} \\ & 8 & & 4 & & 8 & \\ \hline & \cancel{49} & & & & \cancel{175} & \\ & \cancel{7} & & & & 25 & \end{array}$$

∴ Sum = £100. Ans.

Geometry.

1. **GRACIAS A DIOS.**—ABC is a triangle, and the exterior angles at B and C are bisected by the straight lines BD, CD respectively, meeting at D; show that the angle BDC together with half the angle BAC make up a right angle. (*Todhunter.*)



Produce AB to any point F, and AC to any point G.

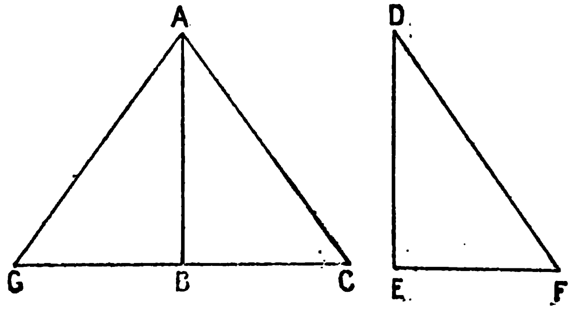
Bisect the angles CBF, BCG by the straight lines BD, CD meeting at D.

Bisect the angles ABC, ACB by the straight lines BE, CE meeting at E. Join ED.

Proof.—∠ EBC = half ∠ ABC,
∠ DBC = „ ∠ FBC,
∴ ∠ EBD = „ ∠s ABC, FBC
= „ of 2 right angles; (I. 13.)
Wherefore ∠ EBD is a right angle.
Similarly it can be proved that ∠ ECD is a right angle.
Again, ∠s BEC, EBC, ECB = 2 right angles, (I. 32.)
∴ ∠ BEC together with $\frac{1}{2}$ ∠ ABC and $\frac{1}{2}$ ∠ ACB = 2 right angles;
Now, ∠ EBD is a right angle,
∴ ∠s BED, EDB = a right angle, (I. 32.)
Wherefore ∠s BEC, BDC are together equal to two right angles;
∴ ∠s BEC, BDC = ∠BEC + $\frac{1}{2}$ ∠ ABC + $\frac{1}{2}$ ∠ACB, (Ax. 1.)
Wherefore ∠ BDC = $\frac{1}{2}$ ∠ ABC + $\frac{1}{2}$ ∠ ACB; (Ax. 3.)
Adding $\frac{1}{2}$ ∠ BAC to each of these;
∴ ∠ BDC + $\frac{1}{2}$ ∠ BAC = $\frac{1}{2}$ ∠ ABC + $\frac{1}{2}$ ∠ ACB
+ $\frac{1}{2}$ ∠ BAC, (Ax. 2)
= $\frac{1}{2}$ of 2 right angles
= a right angle.

Q. E. D.

2. H. B.—Two right-angled triangles have their hypotenuses equal, and a side of one equal to a side of the other; show that they are equal in all respects. (*Todhunter.*)



Let ABC, DEF be two triangles, having the angles B and E right angles; also let AC be equal to DF, and AB equal to DE. Then the triangles ABC, DEF shall be equal in all respects. Produce CB to G, making BG equal to EF, and join AG.

Proof.—In the triangles ABG, DEF,
sides AB, BG = sides DE, EF,
and $\angle$ ABG = a right angle (I. 13.)
= $\angle$ DEF;
$\therefore$ the triangles are equal in all respects. (I. 4.)
Now, AC = DF, (Hyp.)
and AG = DF;
$\therefore$ AC = AG,
and $\angle$ ACG = $\angle$ AGC, (I. 5.)
and angles ABC, ABG are right angles;
$\therefore$ Triangles ABC, ABG are equal in all respects. (I. 26.)
But the triangles ABG, DEF have been proved to be equal in all respects;
$\therefore$ Triangles ABC, DEF are equal in all respects.
Q. E. D.

Science Notes.

A TEXT *Book of Practical Organic Chemistry, by Chapman Jones, F.I.C., F.C.S., &c., Demonstrator of Practical Chemistry at the Normal School of Science, and Royal School of Mines.* A new edition (the third) of the above work having been called for, the opportunity has been taken of making a thorough revision to bring it into complete accord with the present syllabuses of the Department of Science and Art and of the University of London. At the same time a few changes have been carried out which experience has shown to be desirable in making the amount of work set down to be done more suitable to the time and abilities of the average student. As the book at present stands, the first part is a course suitable for students that are preparing for the Elementary Examination of the Department of Science and Art, and the second part gives the reaction and methods of analysis required for the advanced stage. The third part deals with those substances that are given for detection at the final B.Sc. Examination of the London University, except so far as they are included in the previous pages of the book.

In the experience of some of our best teachers, there is no volume on this subject in which such a practically useful selection of reactions is to be found so concisely and clearly described, and it is hoped that the improvements made in the forthcoming edition will not only enhance its value in the eyes of those who have been accustomed to use it, but secure the patronage of others who have not already had the opportunity of examining the work for themselves.

⁂

WE learn from 'Nature' that Mr. Fletcher, of Warrington, has invented a new compressed oxygen furnace. In this furnace diffusion of the heat, which was the great difficulty in former attempts to use oxygen for this purpose, is secured by using a fine jet of Brin's compressed oxygen directed centrically into one end of a tube a quarter of an inch in bore, open at both ends, the oxygen jet acting as an injector, and drawing with it from four to five times its bulk of air. This tube, containing the mixture of oxygen and air, is used as the central part of an ordinary blowpipe of heavy cast iron, which is placed close up against the burner opening of one of Fletcher's ordinary injector furnaces, lined with refractory material. The power of the furnace depends entirely upon the quantity of oxygen and gas supplied, and can be adjusted to any temperature, from a dull red to that sufficient to an exceedingly high one. The special advantages of the apparatus are that it is entirely self-acting, requires no attendance, and that it greatly increases the range of temperatures which can be obtained by a simple apparatus.

⁂

MR. HOCLING, writing from Adelaide, gives a description of a new Australian mammal. It is an underground burrowing animal, resembling somewhat the Cape mole in its general appearance, but differing in many respects. The total length is 13 inches, no eyes visible, and no external ears. It was found on the overland line from Adelaide to Port Darwin. The collector reports that it must be of rare occurrence, as on questioning the aborigines of the locality, there was only one individual who had seen it before, and then only upon a single occasion.

⁂

THE Committee of the British Association, which was appointed to inquire into the teaching of Chemistry, have made a report. The first conclusion is that Chemistry should be taught in schools, first and mainly, on account of the mental training it affords, and secondly, for the sake of its application and its direct bearing on the facts of everyday life. The chief difficulties are then stated. These are believed to be—(1) defective organization and considerations of expense; (2) the lower value attached to chemistry in comparison with other subjects of the school curriculum; (3) the small amount of time which is devoted to the subject; (4) the necessity of preparation for various kinds of examinations; (5) the absence of good text books; (6) the dearth of properly qualified teachers. The Committee are to continue their labours. It cannot be denied that there is some truth in all these statements, and a good deal of it in a few of them. The chemists, however, do not seem to have apportioned any part of the blame directly to themselves. Some certainly, and possibly several of those present, were responsible for most of the examination questions set, and what is much more important, for the requirements upon which they were based. If it is well that these requirements should be drawn up, it cannot be wrong if they are adhered to. If the teacher is pressed for time, and can only cover a limited field, is it not best that he should attend to what eminent chemists have mapped out, and to such aspects of it as by their questions they think most important? The chemists must make their choice. Either they must give more liberty, and allow teachers to teach what they like, and in the way they best can, or else they must be content with the sort of results they get now. If the results are wrong, it is more the fault of the system than the teachers.

⁂

THOSE of our readers who are interested in photography will be glad that their attention has been called to an excellent manual on the subject. It is called 'An Introduction to the Science and Practice of Photography,' by Mr. Chapman Jones. Those who have at any time had the advantage of Mr. Jones's instruction will know what to expect. Those who have not will be pleased that we have directed their notice to this book.

⁂

THE School of Art Wood-carving, City and Guilds Institute, Exhibition-road, South Kensington, has been re-opened after the usual summer vacation, and we are requested to state that one or two of the free studentships in the evening classes, maintained by means of funds granted to the school by the institute, are vacant. To bring the benefits of the school within the reach of artisans, a remission of half-fees for the evening class is made to artisan-students connected with the wood-carving trade. Forms of application for the free studentships, and any further particulars relating to the school may be obtained from the manager.

⁂

THERE seems to be something contagious in the splendid generosity recently exhibited by some of the wealthy companies of individuals. Only a short time ago the Goldsmiths' Company offered the munificent bequest of £85,000 to found a Technical School at New-cross, and now the Mercers' Company have made another handsome offer of the same kind. This is what educationists have long been wishing for. There can be no possible doubt but that institutions thus founded will prove much better for the special needs of the districts than institutions founded and regulated by the State.

Oral Teaching: The Preparation of Lessons and of Notes of Lessons.

BY JOSEPH H. COWHAM, F.G.S.,

Master of Method: Westminster Training College.

Answers:— Kinds, and the Educational value of each.

1. **The Simultaneous Answer.**—There are two conditions of oral teaching in which the simultaneous answer is admissible and indeed valuable: the first is when information has been supplied either by the teacher or some member of the class, and the group of scholars is required simply to repeat what they have been told; the second is when by a series of preliminary teaching processes—by statement, by illustration, and by conversational exercises between the teacher and his pupils, the latter have been led, step by step, to the establishment of a new truth; this new knowledge may then be received from the class in the form of a simultaneous answer. The former is a teaching device whereby the attention of the entire class is stimulated and the memory is exercised by the simple effort of repetition; its educational effect is not great and hence it should not be frequently used: the latter, when successful, is an educational result of the highest value, bringing into exercise the powers of connected and continuous thought in the processes of comparison which it engages and the efforts of inference which it demands.

This highest result can only be expected where the members of the class are nearly equal in attainment, where the teacher is skilled in his art and has complete control over the attention and the thought of his class. The use of this method of reply under less favourable conditions, viz., with classes made large by the admission of children of varied attainments; by teachers who are only as yet acquiring the teaching art, and under a system which requires a large amount of effort to be bestowed upon the dull and slow, is deservedly subject to much adverse criticism; but with the multiplication of large classes of children of equal ability and the increased employment of trained teachers the simultaneous method may become more widely adopted. Whether the simultaneous answer be retained or not the value of the educative processes upon which it is sought to be based cannot be denied, for no teacher is content in his attempts at oral teaching with less than the power completely to direct the entire thought of his class towards the acquisition of the knowledge which he is prepared to impart. When this is accomplished it matters little whether the statement which follows the successful teaching effort be an answer by one or by many tongues.

The following is a full description of a simultaneous answer, and the process by which it may be secured together with its educational effects as these were understood by those who practised the Stow or Glasgow system of oral teaching:—

A **simultaneous answer** is one given by all or nearly all of a class **as the result of a previous educative process.**

> Where this process has not been gone through the answer is merely indiscriminate, how few or how many soever have united in giving it; and its value is comparatively small. It is to answers such as those defined above that Mr. Stow refers when he speaks of the process of 'picturing out in words' being conducted by answers **chiefly simultaneous but occasionally individual.**

How this Simultaneous Answer is Obtained:

1. Questions are addressed to a class of various degrees of difficulty. If a question refers to something familiarly known, either from the children's observation or as the result of previous teaching, it may possibly be answered by all, but is not to be regarded as a simultaneous answer in the sense now intended. On the other hand it may refer to something entirely new and be answered by none.

> These extremely easy and extremely difficult questions are not without their use. They may serve to guide the current of thought into those channels

into which the teacher desires it to flow; they may also serve to introduce a new topic or to recall new knowledge to be again made use of; or, on the other hand, the too difficult question may serve to show the teacher the limits and extent of the children's knowledge.

Between these extremes a question of any degree of difficulty may be asked.

2. **This question constitutes the first step in the educative process** by which the simultaneous answer is to be obtained. The answer given to such a question will be an indiscriminate one, and the teacher should resort to any device at his command which will encourage the children to attempt a reply.

The chief purposes which such answers as these serve are to keep the advanced and brighter members of the class active, to encourage thought amongst them, to promote a kindly form of emulation, and to carry on the process of instruction in a manner more interesting to the children than could be done by stating each successive point in the lesson as a separate proposition. In most cases, if the questions are not unreasonably difficult, perhaps an answer will be got from half-a-dozen children. This answer may be right or wrong, and must be dealt with accordingly.

In either case the second part of the process now begins, and the purpose of it is to correct what is erroneous, to complete what is partial in the children's knowledge, and to render the information and thought of the few the property of all. Merely allowing the children a little more time to dwell upon what has just been brought before them is sometimes sufficient. This may be done by simply inverting the answer given, and by making an ellipsis for the children to fill up, or by asking the question again in simpler form, taking care to avoid an unvaried repetition of the original question.

This process of simplifying terms, of allowing time, of varying the mode of presenting a question, is in itself an educative one, though of a very simple kind. If it is found to succeed, and an answer got from all, or nearly all, the purpose is answered, and the teacher may proceed to the next point in the lesson. But if this prove insufficient, a condition of things easily told by the sparseness of the answers, then—

The Third Stage of the process begins in which the teacher resorts to a process of exposition in which familiar illustration of the topic under consideration must be employed. The illustration may be comparisons stated verbally, the exhibition of a picture, or the use of a diagram, &c.

It should here be observed that failure at this stage is frequently due to the illustration used being familiar enough to the teacher but not equally so to the class; or it arises from the illustration being taken from a text book, and not fully assimilated by the teacher's own intelligence. Having by this process simplified the topic; turned it over before the minds of the children, and presented it in various aspects to the pupils' thought—if in this way the teacher has been successful, then the knowledge at first possessed by a few has become the property of all, and we at once arrive at—

The final stage of the process, viz., the simultaneous answer properly so called. The teacher reverts to the point originally started and answered first indiscriminately; he presents it again in the form of a direct question, and the answer ought now to be given by all, or nearly all, the children under instruction. The degree in which this is obtained is the test of success in the previous parts of the process, particularly the illustrative portion of it.

If the process has failed what is to be done? Obviously, however great may be the demand on the teacher's patience, the illustrative work must be done again, and its success again tested in the manner described. Practically, however, with a teacher of moderate skill this does not often occur. Every successful point in a lesson which is felt to be important should be thus brought out by an answer spread as widely over the class as possible. In this way the new matter taught becomes fixed, and the lesson is most effectively prevented from degenerating into a lecture.

When the simultaneous answer has been successfully obtained we shall then find a use for individual answering. It is only in comparatively rare cases that absolutely every child can be got to answer with all the rest, by any amount of teaching skill; children are always to be found who from constitutional dulness or habitual idleness cannot be induced to keep pace with their school fellows; of course every teacher knows where to look for these in his own school, and after every simultaneous answer it would be well that one or more of these backward children should have his attention quickened and tested by an individual question. If in addition to these he should now and then select others less markedly deficient or, even more rarely, some of the more advanced scholars, the result could not fail to be beneficial. The teacher will by these means be saved from making too high an estimate of the bright and intelligent scholars and will at the same time frequently discover where he needs to be more exact or more lucid even for these advanced scholars.

An Admixture of Individual and Simultaneous Answers is best. Children who have followed the processes of thought by which a definite mental result has been reached, are sufficiently rewarded if they are permitted to state this result in language before their school fellows; further, this statement establishes more firmly the knowledge acquired, and tends to make it a permanent possession. Where, however; the simultaneous answer is not encouraged at all, but the process of training just detailed is successfully used, the children who are anxious to show their knowledge need sometimes to be corrected for supplying answers before being asked. Frequent corrections of this kind tend to discourage effort, and the pupil is apt to feel disappointed if at every stage in which he has successfully worked, other pupils are permitted to exhibit their knowledge, whilst his ability and industry remain without such public recognition. On the other hand unless a teacher possesses superior skill in teaching, and remarkable power of control joined to a very thorough apprehension of the knowledge and ability of the members of his class, the abundant use of the simultaneous answering is very likely to deceive him in his estimate of the number of his scholars engaged in earnest effort, and to afford the means by which the dull and indolent may remain in that condition.

The wise course appears to be that which avoids anything approaching the exclusive use of either the simultaneous or the individual mode of answering, and one which whilst it demands sufficient individual replies from the slow to spur them to the necessary effort, and from the quick in order to afford them the opportunity of setting a worthy example to the rest, at the same time retains some answers to be attempted by all, so that every child may feel that he has taken an active, if not a prominent share in announcing the results of his effort during the lesson.

Elliptical Answers.—Disapproval has already been expressed in these chapters of an extensive use of these answers on the ground that they do not encourage sufficiently complete utterances to thought; to this fault may be added the inducement they offer for guessing, and giving answers which the immediate context suggests, rather than the whole sequence of thought demands. They are especially useless when they are degraded to half word replies. All that can be said in their favour is well stated as follows by Currie:—

> 'Some use this kind of answering more than others; the ardent and sympathetic teacher uses it most, and succeeds best with it. He carries his pupils along with him, identifies his mental action with theirs, and withdraws his assistance just before the end, trusting that the impetus he has given them will carry them to the completion. It contributes remarkably to keep up the continuity of thought in a lesson. Altogether, the use of elliptical answers makes a lesson smoother and more flowing in its progress.'

The following is an example of both good and bad elliptical forms of reply. By means of a paper model a teacher had led his class to see that $\frac{2}{4}$ of the paper strip was equal to $\frac{1}{2}$ of it. The two fractional expressions were placed on the board, thus, $\frac{1}{2} = \frac{2}{4}$. The teacher then asked the following question: 'What must I do to the fraction $\frac{1}{2}$ to make it $\frac{2}{4}$?' 'Multiply,' said one in reply. 'Yes, I must multiply,' said the teacher, 'but cannot you tell me what I must multiply?' The children hesitated, and in order to help them the teacher threw his question into the elliptical form, and said, 'In order to obtain the fraction $\frac{2}{4}$ from $\frac{1}{2}$ I must multiply its numerator and denominator by the same num(ber).' The useful answer is the part of the sentence underlined, the portion of the word in brackets is useless as an answer.

Remaining Modes of Reply.

1. When in doubt as to the number who may be able to give an answer, the children should show ability to answer by show of hands.

Do not continue to ask for answer one after another beyond two of those who can reply. The children are apt to think the answers previously supplied are wrong, and hence to change their reply.

2. If the answers are for purposes of revision it is well to receive them from all parts of the class, and sometimes to select an entire row of children to reply in turn.

This is especially stimulating to scholars who are apt to count upon their chances of being overlooked. These do not wish to be exposed as the only ignorant pupils in the class.

3. Children known to be backward and to need stimulus should receive frequent attention and be often prompted to reply.

It is not well to ask for a show of hands and then habitually to neglect these replies in order to require those who cannot answer to make the attempt. Sometimes this mode of taking replies is allowable, but not often.

Mutual Questions and Answers. There is no doubt that when a class is under effective control this method of conversation is of excellent use in affording variety of exercise, in cultivating a power of full and complete expression, and in rousing the scholars to concentration of effort, first in shaping the question and subsqueently in receiving the answer. The contention that this method leads to childish vanity is made either by those who have had no opportunity of trying the method on a large group of children, and hence are mere theorists, or by those who have failed in the use of it because their power of direction was such that their pupils could not be entrusted with this liberty without abusing it.

(To be continued.)

Publications Received.

G. Bell & Sons.—Practise and Help in the Analysis of Sentences (*Mason*).

Blackie & Son.—The Century Readers, Primers I. and II., Infants, Nos. 1, 2, and 3; When I was a Boy in China (*Yan Phou Lee*); The Brig 'Audacious' (*Alan Cole*); The Lion of St. Mark (*G. A. Henty*); Hugh Herbert's Inheritance (*C. Austin*); The Cat of Bubastes (*G. A. Henty*); Susan (*Amy Walton*); Swiss Stories (*Lucy Wheelock*); Linda and the Boys (*C. S. Lowndes*); The Battlefield Treasure (*F. Bayford Harrison*); Joan's Adventures (*A. Corkran*); Filled with Gold (*J. Perrett*); Edwy (*A. Lyster*); A Series of Fourpenny Reward Books; Little Lady Clare (*E. E. Green*); Under False Colours (*Sarah Doudney*); Storied Holidays (*Brooks*); Under Hatches (*Frankfort Moore*); In the Summer Holidays (*Jennett Humphreys*); How the Strike Began (*Leslie*); Tales from the Russian of Mdme. Kubalensky; Cindrella's Cousin; Their New Home (*A. S. Fenn*); Janie's Holidays (*C. Redford*); Dew (*M. Wilson*); The Old Violin (*J. Lockart*); Mischievous Jack (*A. Cockran*); The Twins (*L. E. Tiddeman*); Pet's Project (*C. Langton*); The Chosen Treat (*C. Wyatt*); The Queen of Squats (*J. Hornibrook*); Shucks (*E. Leslie*); Sylvia Brooke (*M. H. M. Capes*); The Little Cousin (*A. S. Fenn*); In Cloudland (*Mrs. Musgrave*); Self Exiled (*J. A. Stewart*); Gianetta (*Rosa Mulholland*); Captain Bayley's Heir (*G. A. Henty*); Play in Work and Work in Play (*John Hassell*); Outlines of Natural Philosophy (*Everett*).

Cassell & Co., Limited.—The Black Arrow (*R. Louis Stevenson*); The True Glory of Woman (*Landels*); Little Folks; Bo-Peep; Marine Painting (*Walter W. May*); Cassell's Book of Sports and Pastimes.

The Cambridge University Press.—Elementary Commercial Geography (*Hugh Robert Mill*).

W. & R. Chambers.—Great Thinkers and Workers (*R. Cockrane*); Elementary Physiography (*Findlater*).

The Clarendon Press.—Vocabulary to Xenophon's Anabasis (*J. Marshall*).

Curwen & Sons.—Cantata: Evangeline (*J. Graham*); Cantata: Daisy Dell (*Edmund Rogers*).

Dean & Son.—Clarkson's Musical Pictures.

Hodder & Stoughton.—Vermont Hall (*M. A. Paull*).

Longmans & Co.—Introduction to Practical Inorganic Chemistry (*Jago*); Longmans' Handbook of English Literature, Part I. (*McWilliam*); Longmans' Junior School Arithmetic.

Macmillan & Co.—Examples in Physics (*D. E. Jones*); A Latin Reader for the Lower Forms in Schools (*H. J. Hardy*); Easy Exercises in Greek Accidence (*H. G. Underhill*); Stories and Legends (*F. H. Colson*); First Greek Grammar (*W. Gunion Rutherford*); Elementary Statics (*J. B. Lock*).

T. Murby.—Dr. Dick's Historical and Commercial Geography and Atlas.

THE NATIONAL SOCIETY.—Silver Star Valley (*M. Bramston*); To Horse and Away (*F. M. Peard*); Starwood Hall; Reuben Everett (*C. R. Coleridge*); St. Helen's Well (*M. H. Debenham*); Carried Off (*Esmé Stuart*); Our New Mistress (*Charlotte M. Yonge*); Mrs. Dimsdale's Grandchildren (*M. and C. Lee*).

T. NELSON & SONS.—The Royal Upper Class Readers—Simple History of English Literature (*A. L. Stronach*).

G. PHILIP & SON.—Code Wrinkles (*Richardson*).

RELF BROS.—The Universal Parsing Book (*Deakin*); An Assistant to the Board of Trade Examinations (*Forbes*); Easy Lessons on Light (*Adams*); The Charterhouse Oxford and Cambridge Atlas.

SMITH, ELDER & CO.—The Cornhill Magazine, November.

SWAN SONNENSCHEIN & CO.—The Student's Pestalozzi (*Russell*); The Cyclopædia of Education, Part 9.

T. FISHER UNWIN.—The Story of the Nations—Mediæval France (*Gustave Masson*); The Century Magazine, November.

WILLIAMS & NORGATE.—French Composition through Lord Macaulay's English—Frederic the Great, with Notes (*James Boïelle*).

My Scholarship Answers.

BY JAMES WILLIAMS,

FRATTON STREET BOARD SCHOOL, PORTSEA.

(*First on the Scholarship List, 1888.*)

MALE CANDIDATES.

Arithmetic.

(*Three hours allowed for this paper.*)

1. (*a*) Subtract 107 from 305, clearly explaining the process, as to a class of young children.

(*c*) Prove the rule for finding a vulgar fraction equivalent to ·3$\dot{4}\dot{5}$.

(*d*) Define compound interest, stocks, proportion, mean proportional, with examples.

(1) (a)

$$\begin{array}{r} 305 \\ \underline{107} \\ \underline{\underline{198}} \end{array}$$

We cannot take 7 from 5, because 5 is less than 7. Add 10 to top figure, 10 and 5 = 15. 15 − 7 = 8. Set 8 in answer space. Having given the top line 10 extra we must add 10 also to the lower line, at the next figure, the 0. In this row 1 will mean 10, so add 1. 0 + 1 = 1. 1 from upper figure, the 0, we cannot take. As before add ten to upper figure, 10 + 0 = 10. 1 from 10 = 9. Set 9 in line. As before we shall have to add 10 to the next bottom figure, 10 being represented there by 1. 1 + 1 = 2. 2 from 3 = 1. Set down 1. Ans. = $\underline{\underline{198}}$.

(c) The dec. = ·3454545
dec. × 1000 = 345·4545 I.
dec. × 10 = 3·4545 II.
Subtract II. from I. then 990 times the dec. = 342.

$$\therefore \text{The dec.} = \frac{342}{990} = \frac{345-3}{990} = \frac{19}{55}$$

i.e., Take the unrecurring figures from the whole decimal and the remainder is the numerator of the fraction; the denominator = a '9' for every recurring figure, followed by a '0' for each unrecurring figure. The fraction thus formed to be brought to its lowest terms.

(*d*) *Interest* = Sum paid for the loan of money. Thus, if I borrow £100 and pay £3 for the use of it; £3 = the Interest.

Compound Interest. That kind of Interest which, as it becomes due, is added to the Principal (*i.e.*, the money lent), and the Interest for the next period is calculated on this increased sum. Thus if I have £100 at £10 per cent.; I pay £10 for the first year and the same every year, at *Simple* Interest; but at *Compound* Interest the £10 would be added to the £100, = £110 and the second year's Interest would be £11 instead of £10.

Stock = (*a*) The working capital of trading companies;
(*b*) The funded debt of a state.

Thus if I am a fund-holder in the 'Three Per Cent. Consols,' or have shares in a Railway Company or other commercial concern, I possess *stock*.

Proportion = the equality of two ratios. *Ratio* is the magnitude of one quantity in comparison with another of the same kind. Thus the ratio of 5 cows to 7 cows = $\frac{5}{7}$, the first being $\frac{5}{7}$ of the second; the ratios of 10 cows to 14 cows, 15 days to 21 days, are similarly expressed :—$\frac{10}{14}$, $\frac{15}{21}$. These fractions it is clear = $\frac{5}{7}$. Then we say that 5, 7, 10, 14 form a *proportion*, symbolically expressed—$\frac{5}{7} = \frac{10}{14}$, or 5 : 7 :: 10 : 14.

Mean Proportional = the number which forms the numerator of one fraction and the denominator of the other fraction in a proportion, thus :—$\frac{3}{6} = \frac{6}{12}$ or 3 : 6 :: 6 : 12. Here 6 is a mean proportional.

2. A man laid out £14 5s. 9d. on gloves, at 2s. 3d. the pair; some of them faded, and were unsaleable; the rest he sold for £18 11s. 3d at 3s. 4½d. the pair. How many pairs faded?

(2) No. of pairs bought = $\frac{\text{£14 5s. 9d.}}{\text{2s. 3d.}}$ $\frac{1142}{9}$ = 127 pairs.
" " sold = $\frac{\text{£18 11s. 3d.}}{\text{3s. 4½d.}} = \frac{1485}{4} \times \frac{8}{27}$ = 110 pairs.
" " faded = 127 − 110 = $\underline{\text{17 pairs.}}$ Ans.

5. On a rock are three revolving lights: one revolves in 2 m. 12 sec., another in 3 m. 7 sec., the third in 3 m. 24 sec. I saw them all bright at midnight. When will they next be so?

(5) Required time = L.C.M. of 132, 187, 204
= L.C.M. of 11 × 12, 11 × 17, 12 × 17
L.C.M. = 11 × 12 × 17 = 2244 sec. = 37 min. 24 sec.
$\underline{\text{37 min. 24 sec. after midnight.}}$ Ans.

7. A rectangle 363 feet long covers ·0003125 of a sq. mile. How wide is it?

(7) $·0003125m = \frac{3125}{10000000} = \frac{1}{3200}m = \frac{528 \times 528}{32}$ ft.

Length × breadth = $\frac{528 \times 528}{32}$ sq. ft.

breadth = $\frac{528 \times 528}{32 \times 363} = \underline{\text{24 ft.}}$ Ans.

8. If the rent of 420 acres be £1,621 8s. 4½d., how many acres (at the same rate per acre) would be rented for £1,389 15s 9d.?

(8) £1,621 8s. 4½d. = 32428⅜s. = $\frac{259427}{8}$s.
£1,389 15s. 9d. = 27795¾s. = $\frac{111183}{4}$s.
No. of ac. rented for $\frac{259427}{8}$s. = 420
" " " 1 = $\frac{420 \times 8}{259427}$
" " " $\frac{111183}{4} = \frac{420 \times 8 \times 111183}{259427 \times 4}$
$= \frac{420 \times 2 \times 3}{7}$ = $\underline{360}$ acres. Ans.

9. A man divides £504 amongst his three sons, whose ages are 19, 21, and 23, in sums proportional to their ages. Three years afterwards he similarly divided an equal sum. How much did each receive in all?

(9) *First sharing.* No. of shares = 19 + 21 + 23 = 63
A gets $\frac{23}{63}$ of £504 = 23 × 8 = £184
B " 21 × 8 = £168
C " 19 × 8 = £152

Second sharing. No. of shares = 22 + 24 + 26 = 72
A gets $\frac{26}{72}$ of £504 = 26 × 7 = £182
B " 24 × 7 = £168
C " 22 × 7 = £154

Totals.
A = 184 + 182 = £366
B = 168 + 168 = £336 } Answer.
C = 152 + 154 = £306

10. A square chess board contains 64 equal squares, and the area of each square is 1·3225 sq. in. The rim running round the board is two-fifths of an inch wide. Find the length of the board's side.

(10) Area of inner square $= 1{\cdot}3225 \times 64$ sq. in

Side of inner square $= 8\sqrt{1{\cdot}3225} = 8 \times 1{\cdot}15$ in. $= 9\frac{1}{5}$ in.

To this add twice the rim; then outer edge $= 9\frac{1}{5} + \frac{2}{5} + \frac{2}{5} = 10$ in. Ans.

11. A sold a horse to B, gaining $7\frac{1}{2}$ per cent. on what it cost him; B sold it to C for £70 19s., gaining 10 per cent. on what it cost him. What did A pay for the horse?

(11) A sells it for $\frac{107\frac{1}{2}}{100}$ of cost price $= \frac{215}{200} = \frac{43}{40}$

B ,, ,, $\frac{11}{10}$ of $\frac{43}{10}$,, $= \frac{11 \times 43}{400} = 1{,}419$s.

Cost price (*i.e.* 1) $= \frac{\overset{3}{\cancel{1419}} \times 400}{\cancel{11} \times \cancel{43}} = 1200$s.

$= \underline{£60.}$ Ans.

12. In what time will £3,200 amount to £4,460 at $3\frac{1}{2}$ per cent. per annum, simple interest?

(12) £3,200 produces £$32 \times 3\frac{1}{2}$ per year $=$ £112

To get £$(4{,}460 - 3{,}200)$ will take $\frac{1260}{112}$ years.

$\underline{= 11\frac{28}{112} = 11\frac{1}{4}\text{ years.}}$ Ans.

13. A casket contains diamonds and pearls; the diamonds are worth as many times the pearls as the pearls are worth the casket, and the values of the diamonds and the casket are £3,411 9s. and one guinea respectively. Find the value of the pearls.

(13) £3,411 9s. $= \frac{68229}{21}$ guineas $= 3{,}249$ guineas

Value of pearls $= \sqrt{3249}$ guineas $= 57$ guineas.

$\underline{= £59\ 17\text{s.}}$ Ans.

14. Find the present worth of £1,755 15s. $6\frac{1}{4}$d. due four months hence at $4\frac{1}{4}$ per cent. per annum.

(14) £1,755 15s. $6\frac{1}{4}$d. $= £\frac{1685545}{960}$

£100 for 4 mo. at $4\frac{1}{4}\% = \frac{17}{12}$. Amt. $= £\frac{1217}{12}$

Present Worth of $£\frac{1217}{12} = £100$

,, ,, $1 = \frac{1200}{1217}$

,, ,, $\frac{1685545}{960} = \frac{1200 \times 1685545}{1217 \times 960}$

$\underline{= £\frac{6925}{4} = £1{,}731\ 5\text{s.}}$ Ans.

15. What income is derived from the investment of £188,497 in the $2\frac{3}{4}$ per cents. at $101\frac{1}{8}$? (Brokerage not to be reckoned.)

(15) £$101\frac{1}{8}$ will produce $£\frac{11}{4}$

1 ,, $\frac{11}{4} \times \frac{8}{809} = £\frac{22}{809}$

188497 ,, $\frac{22 \times 188497}{809} = 22 \times 233$

$\underline{= £5{,}126.}$ Ans.

History.

1. Explain the circumstances which led to the Norman Conquest, and give a short account of the battle of Hastings.

(8) The Saxon monarch preceding Harold had been many years in Normandy, and was indeed more a Norman than a Saxon. When made king he brought over shoals of Normans, and bestowed various offices upon them; this no doubt first put into the mind of Duke William the idea of invading England. And when Harold, the future king of England, was, by shipwreck, in William's power, he had to promise his help to the Normans on their invasion before he was released. William heard in 1066 of the accession of Harold, and immediately set about preparing for his projected attack. He alleged as his reasons—(1) The perjury of Harold (who had promised his support). (2) The bequest of the late king Edward. (3) The massacre of the Danes by Ethelred 60 years before. (4) The expulsion of the Normans (1052) from England through the influence of Godwin (Harold's father). The first reason brought the Papal sanction, and a consecrated banner. William landed at Pevensey, and marched towards the English encampment at Senlac. The *Battle of Hastings* was for five or six hours undecided; till a feigned retreat of the Normans enticed the English from their palisades on the hill-top, when they were attacked by the Norman cavalry. Arrows and bolts were thinning the ranks of the Saxons, and when Harold was struck the battle was decided. The Saxons broke and fled, and the victory remained with the Normans.

10. State any facts you know relating to the foreign policy of Cromwell and of Charles II. respectively.

(10) *Cromwell*, though not fortunate in his home government, was eminently successful in his foreign policy, and made England as much respected by other nations as in Elizabeth's time. He humiliated the Dutch (in 1652-4); Louis of France sought his aid against Spain, and handed over Dunkirk to England as payment for the service of the English veterans; the Mediterranean pirates were taught to respect the English flag; and the Duke of Savoy was obliged to cease his persecution of the Waldenses (the Protestants of Vaudois). *Charles II.*, on the contrary, was ready to submit to any nation if it suited his purpose. His great purpose was to remain king of England without being under the control of Parliament. This he thought he could accomplish by cultivating the friendship of Louis. As a specimen of Charles' traitorous, truckling, policy, we have the treaty of Dover (1670), when he promised to profess himself a Catholic and join Louis in the war against Holland; thus, while he agreed to the severe laws against Papists passed by Parliament, he was a Catholic himself, in receipt of a pension from a Catholic king.

11. In whose reigns did Dryden, Chaucer, Sir Walter Scott, Sir Philip Sydney, Thomas Carlyle, and George Herbert live respectively? Mention the writings of any two of them.

(11) *Dryden*, William III.; *Chaucer*, Edward III.; *Sir Philip Sydney*, Elizabeth; *George Herbert*, Charles I. *Sir Walter Scott*, George III. and George IV. His chief *works* are:—(1) 'Lady of the Lake,' (2) 'Lay of the Last Minstrel,' (3) 'Marmion,' (4) 'Lord of the Isles,' (5) a long series of novels, including 'Waverley,' 'Ivanhoe,' 'Guy Mannering,' 'Antiquary.' *Thomas Carlyle* lived in reigns of William IV. and Victoria. *Works*:—(1) 'French Revolution,' (2) 'Letters and Speeches of Oliver Cromwell,' (3) 'History of Frederick II. of Prussia,' (4) 'Sartor Resartus.'

12. When and in what circumstances were the following battles fought:—Aylesford, Barnet, Corunna, Vinegar Hill, and Lexington?

(12) *Aylesford*, 455.—The Jutes under Hengist and Horsa defeat the Britons. Horsa slain.

Barnet, 1471.—Warwick the 'king-maker' is defeated and slain by Edward IV.

Corunna, 1809.—Sir John Moore repels French, but is killed in action.

Vinegar Hill, 1798.—General Lake crushes the Wexford rebellion.

Lexington, 1775.—The skirmish which opened the war with the American Colonies.

14. Explain what is meant by the Star Chamber, Bill of Attainder, Habeas Corpus, Ship Money, Act of Supremacy, and Poyning's Law.

(14) *Star Chamber.*—The court instituted by Henry VII. It punished by fines and imprisonment, but had not the power of life and death. It grew tyrannical and was abolished in 1541 by the Long Parliament.

Bill of Attainder.—An accusation drawn up by the Commons against some person or persons, and tried by themselves. The House of Commons is thus both prosecutor and judge; hence a bill of attainder is unjust.

Habeas Corpus.—The writ, which every prisoner can claim if unduly detained, directing the gaoler to bring him up for trial. The name of a bill passed in 1679 to prevent illegal and indefinite imprisonment, and forbidding imprisonment beyond sea.

Ship Money.—Originated in 1008. The assessment levied for the building and equipment of ships for national defence. Appears prominently in history in connection with John Hampden (1634).

Act of Supremacy passed in 1534 made Henry VIII. the head of the Church, with power to redress heresies and abuses.

Poyning's Law or Statute of Drogheda passed in 1495 enacted (1) No bill could be introduced into the Irish Parliament before it had been approved by the English Parliament; (2) All statutes lately passed in England should be law in Ireland.

Grammar.

1. Analyse fully the following passage, and parse the words printed in *italics*:—

When Henry *the Eighth* attempted to raise a forced *loan* of unusual amount by proceedings of unusual rigour, the opposition *which* he encountered was such *as appalled even* his stubborn and imperious spirit.

(1)

SENTENCE	KIND OF SENTENCE	SUBJECT	PREDICATE	OBJECT	EXTENSION
1. When Henry the Eighth attempted to raise a forced loan of unusual amount by proceedings of unusual rigour	Adverbial (time) to (2)	Henry the Eighth	attempted	to raise a forced loan of unusual amount	when (time) by proceedings of unusual rigour (manner)
2. The opposition was such	Princ. Assert.	The opposition	was such		
3. which he encountered	Adjectival to (2)	he	encountered	which	
4. as (that was)	Adverbial to such (2)	(that)	(was)		
5. (which) appalled even his stubborn and imperious spirit.	Adjectival to (that) in (4)	(which)	appalled	his stubborn and imperious spirit	even (degree)

The	Def. Art., referring to *Henry*.
Eighth	Ord. Numeral Adj., limiting *Henry*.
loan	Com. Noun, Sing. Num., Third Person, Neuter Gend., Obj. Case, govd. by *raise*.
which	Rel. Pron., Sing. Num., Third Person, Neuter Gend., agrg. with its antec. *opposition*, Obj. Case, govd. by *encountered*.
as	Conj. joining sentences 2 and 4.
appalled	Verb, Reg. Trans., Act. Voice, Indic. Mood, Past Tense, Sing. Num., Third Person, agrg. with Nom. *which* (und.)
even	Adv. of Degree modg. *appalled*.

2. Paraphrase the following passage, and parse the words in *italics*:

There is in souls a *sympathy* with sounds,
And as the mind is pitch'd the ear *is pleased*
With melting airs or *martial*, brisk or grave.
Some chord in unison with *what* we hear
Is touch'd within us, and the heart replies.
How soft the music of those village bells
Falling at intervals upon the ear
In cadence sweet! now *dying* all *away*,
Now pealing loud again and louder still,
Clear and sonorous as the gale comes on,
With easy force it opens all the cells
Where memory slept.

(2) Music has a peculiar power of awakening emotions within us, and according to our mood, we appreciate some particular style of music. Something seems to respond to the sounds; the very heart seems to beat with the rhythm of the music. For instance, how the chimes of the village bells can affect us; as the sound waxes and wanes with the varying wind, every word and scene associated with the chimes is clearly revived in our minds, after lying dormant, it may be, for years.

Sympathy	Abstr. Noun, Sing. Num., Third Person, Neuter Gend, Nom. Case to *is*.
is	Aux. of Pass. Voice to '*pleased*.'
pleased	Past Part. of Reg. Verb. *to please*.
is pleased	Verb, Reg. Trans., Pass. Voice, Indic. Mood, Pres. Tense, Sing. Num., Third Pers., agrg. with Nom. *ear*.
martial	Adj. of Qual. qualg. *airs*.
what	Compound Rel. Pron. = that which.
that	Disting. Adj. qualg. (*music*).
which	Rel. Pron., Sing. Num., Third Pers., Neut. Gend., agrg. with antec. (*music*); Obj. Case govd. by *hear*.
dying	Pres. Part. of verb *to die*, qualg. *music* (in 6th line).
away	Adv. of Place, modg. *dying*.

3. Analyse the following lines, and parse the words in *italics*:—

The heights by great men *reached* and kept
Were not attained by sudden flight;
But they, while their companions slept,
Were toiling upward in the night.

(3)

SENTENCES	KIND OF SENT.	SUBJECT	PRED.	OBJ.	EXT. OF PRED.
1. The heights by great men reached and kept were not attained by sudden flight	Principal Assertive	the heights reached and kept by great men	were attained		not (negative) by sudden flight (manner)
2. But they were toiling upward in the night	Princ. Assert. Adversative to 1	they	were toiling		upward (place), in the night (time)
3. while their companions slept	Adverbial (time) to 2	their companions	slept		while (time)

Reached	Past Part. of *to reach*, qualg. *heights.*
were	Aux. of Pass. Voice to *attained.*
not	Adv. of Negation, modg. *were attained.*
attained	Past Part. of verb to attain.
were attained	Verb, Reg. Trans., Pass. Voice, Indic. Mood, Past Tense, Plur. Num., Third Pers., agrg. with its Nom. heights.

4. Name the different classes of conjunctions, and give an example of each.

(4) I. *According to the kinds of sentences they join* :—
(1) *Co-ordinative*, joining two principal sentences; as—'He rose *and* looked earnestly at me.'
(2) *Subordinative*, joining principal with subordinate; as—'I told him *that* I could not go.'
II. *According to their meaning* :—
(1) *Copulative*, joining in form and also in meaning; as—'The king rose *and* all did the same.'
(2) *Disjunctive*, joining in form, but disconnecting the meaning; as—'I called *but* he returned no answer.'
(3) *Correlative*, those used in pairs; as—'I love *both* flowers *and* trees.' 'He had *neither* friends *nor* money.'

6. Give three prefixes of Saxon and three of Latin origin, and three suffixes by means of which nouns are derived from verbs, with two examples under each head.

(5) I. *Saxon Prefixes*—
En (= to make) as in enable, enrich
off (= from, away) ,, offal, offshoot
un (= reversal) ,, unfurl, unlock
II. *Latin Prefixes*—
Pre (= before) as in precede, preamble
sub (= under) ,, submarine, subvert
trans (= across) ,, transport, transparent
III. *Suffixes*—
Ster, as in spinster, songster
ance, ,, acceptance, assistance
or, ,, actor, editor

7. Write notes of a first lesson on the analysis of a simple sentence.

(7) *Time*, 20 min. *Class*, Standard IV.
Apparatus (1) Blackboard and accessories.
(2) Slates for scholars.

MATTER TO BE TAUGHT.	METHOD OF TEACHING.
Examples— (the) Fire burns bread is good I am looking You are tall he spoke (the) room is large. The *Subject* is that about which we are speaking. The *Predicate* is what we say about the Subject.	Obtain some nouns and pronouns from class; select the most suitable to be written on the board in a column. Then ask for *something about them*, as exemplified in other column. Then take the first line (*i.e.*, the fire burns) and by question educe that we are speaking about *fire*; treat others in similar way. Tell them the name *Subject*. Returning to first piece 'What do we *say about* fire?' &c. What we say about the subject is the *Predicate*. Give short sentences to analyse on the slates.

Composition.

(2) *The importance of the telegraph and telephone from a commercial point of view.*

One of the greatest of the many boons of modern time is the facility with which we can communicate with distant parts of the earth. For this we are indebted to the power of electricity, as applied in the telegraph and telephone. The network of wires running over land and under sea is a very important factor of the commerce of to-day.

We have only to cast a glance at a newspaper to see the connection between trade and telegraph. Stock Exchange news, market quotations can be made known afar off in a very short time, so that markets are equalised, or rather the whole world becomes merely *one* market. It does not affect the productive power of a country, but it remarkably aids in the distribution of the produce. It also minimises the risk of panics and failures, for we can by its means receive speedy intelligence of events bearing on our particular trade or industry, and act accordingly.

The telephone is of great service for shorter distances. It is in fact the most convenient and ready means of communication we have, for it dispenses with letter-writing, and there is no special mode of signalling to acquire as in the telegraph. It stands in the same relation to the telegraph that a wheel-barrow does to a railway-truck—not so powerful and far-reaching as the telegraph, but more handy for petty purposes. Doctors find it a useful communication between the surgery and the private house; main stores and branches are brought 'next door' to one another by its means, and towns at moderate distances can be connected. The system is much more used in America than in our own country, and proves a valuable adjunct in commercial affairs.

Euclid.

(*Three hours allowed for this paper.*)

(Marks are given for portions of questions.)

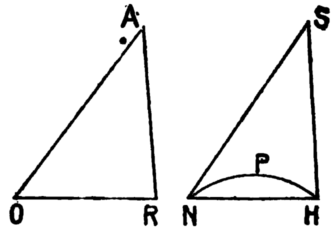
In the Euclid questions all generally understood abbreviations for *words* may be used, but no symbols of *operations* (such as −, +, ×) are admissible.

N.B.—Capital letters, not numbers, must be used in the diagrams.

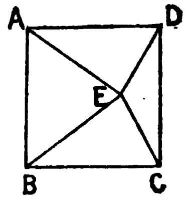
1. (*a*) If two triangles have two sides of the one equal to two sides of the other, each to each, and have likewise the angles contained by these sides equal to one another, they shall also have their bases or third sides equal; and the two triangles shall be equal, and their other angles shall be equal, each to each, namely, those to which the equal sides are opposite.

(*b*) ABCD is a square, ABE an equilateral triangle. If EC, ED be drawn, the triangle DEC is isosceles. (It may be assumed that the equilateral triangle is equiangular.)

(1) (*a*) (Euclid I. 4.) Let AOR, SNH be the two triangles, having OA, and AR respectively = NS, SH, and angle A = angle S. Then the triangles shall be equal in every respect.



Apply the triangle OAR to NSH, placing A upon S, and AO upon SN, then O will coincide with N, because AO = SN (hyp.); AR will coincide with SH, because angle A = angle S, and R will fall on H because AR = SH. So base OR must fall on base NH, for if the two ends fit and the lines themselves do not, but appear as NPH we shall have two straight lines enclosing a space; this is impossible. So OR must fit NH, and we see that the triangles fit each other on all sides, and are in every way equal.

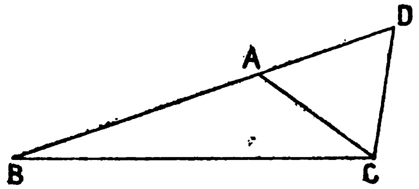


(*b*) Angle DAB = CBA, angle EAB = EBA. Take latter from former respectively, then (ax. 3) angle DAE = CBE, and AD = BC (def. 30) and AE = BE (def. 24.) Therefore (I 4) ED = CE and ECD is isosceles (def. 25).

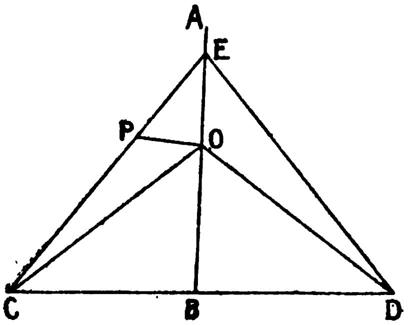
2. (*a*) Any two sides of a triangle are together greater than the third side.

(*b*) AB bisects CD at right angles at B; P is a point within the angle ABC, and CP produced cuts AB at E. Show that the difference between ED and EP is greater than that between any other two lines drawn from P and D to meet AB.

(2) (*a*) Eucl. I., 20. To prove BA and AC together greater than BC. Produce BA to D making AD = AC (I. 3.) Join CD. Angle ADC = ACD (I. 5.) To ACD add ACB. Then DCB is greater than ADC. Therefore (I. 19) BD is greater than BC. BD = BA, AC (constr.) Therefore BA, AC together greater than BC. Similar proof for any pair of sides

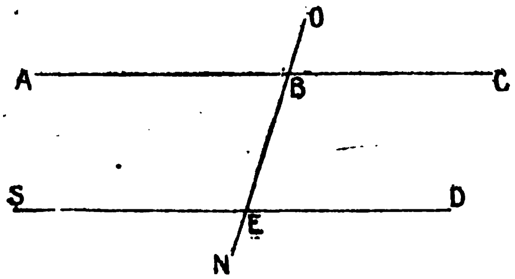


(*b*) CB = DB (hyp.), EB common; and angle EBC = EBD (ax. 11.) Therefore (I. 4) EC = ED and PC is dif. between EP and ED. From P draw any other line PO to AB, and join OD, OC. As before OC = OD (I. 4) CP, PO together greater than CO (I. 20.) From each take PO. Then CP is greater than difference between PO and OC, *i.e.*, between PO and OD.



3. (*a*) If a straight line falls on two parallel straight lines, it makes the alternate angles equal to one another, and the exterior angle equal to the interior and opposite angle on the same side; and also the two interior angles on the same side together equal to two right angles.

(*b*) P is a point between two given parallel straight lines, such that any two straight lines drawn through P always intercept equal portions of the parallel straight lines. Show that P is equidistant from the parallels.

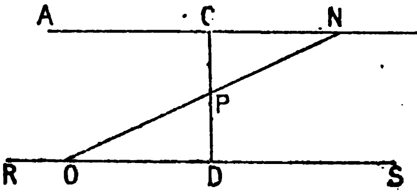


(3) (*a*) Euclid I. 29. Prove (1) ABE = BED; (2) OBC = BED; (3) CBE and BED together = two right angles.

(1) If not equal let ABE be greater. To each angle add CBE. Then CBE, BED less than ABE, CBE; that is, less than two right angles (I. 13), and so AC. SD will meet towards C and D (ax. 12); but they cannot meet because parallel (hyp. and def. 35). So ABE cannot be greater than BED, similar proof shows that BED is not greater, ∴ ABE = BED.

(2) OBC = ABE (I. 15) = BED (see above, No. 1).

(3) To the equals ABE, BED add CBE. Then CBE, BED = ABE, CBE (ax. 2) = (I. 13) two right angles.

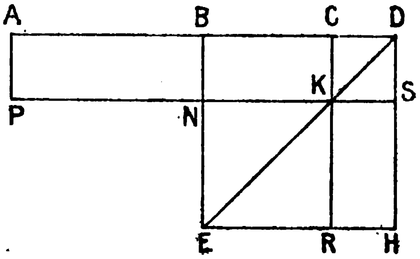


(*b*) To prove the perpendiculars PC, PD on the parallels AB, RS equal.

Draw through P any other straight line ON, meeting AB at N and RS at O. CN = OD (hyp.), angles NCP, CNP = PDO, DOP respectively (I. 29). Therefore (I. 26) CP = DP.

4. (*a*) If a straight line be divided into two equal parts, and also into two unequal parts, the rectangle contained by the unequal parts, together with the square on the line between the points of section, is equal to the square on half the line.

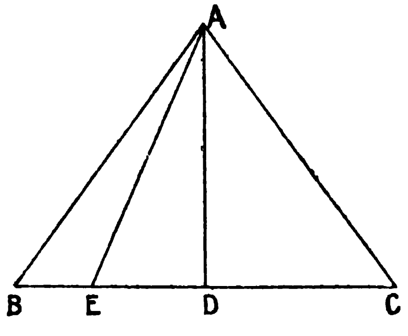
(*b*) From the vertex of an isosceles triangle a line is drawn to any point in the base. The square on a side of a triangle is equal to the square on the line so drawn together with the rectangle contained by the segments into which the line is divided.



(4) (*a*) Euclid II. 5. Let AD be divided equally at B, unequally at C, into two parts. Then rect. ACCD with square on BC shall = square on BD.

On BD describe square BEHD. Join DE (I. 46). Through C draw (I. 31), CR par. to DH or BE, cutting DE at K. Through K draw SP par. to AD or EH, and through A, AP par. to BE. Complement BK = KH (I. 43); to each add CS. Then CH = BS (ax. 2) = AN (I. 36). To equals AN, CH, add BK. Then AK = gnomon BSR (ax. 2). To last equals add square NR (a *square* by II. 4 Cor.) Then AK and NR together = square BH. AK is rect. AC, CD, for CK = CD (II. 4, Cor.) and NR is square on BC for NK = BC (I. 34).

∴ Rect. AC,CD, with square on BC = square on BD.



(*b*) Bisect BC at D (I. 10); join AD. AB, BD = AC, CD respectively and angle B = angle C (I. 6). Therefore angle ADB = ADC (I. 4), *i.e.*, AD is perp. to BC (def. 10). If AD is the line drawn to the base, square AD, and square BD = square AB (I. 47). Square BD = rect. BD,DC. But let the line fall as at AE. Then (II. 5) square DB = square DE and rect. BE,EC. To each add square on AD. Then squares BD, AD = squares ED, AD and rect. BE,EC, *i.e.*, (I. 47), square AB = square AE and rect. BE,EC.

(To be continued.)

Publications Reviewed.

PRIZE BOOKS.

National Society's Publications.

The parcel of books we have received this year for review is attractive and remarkably cheap, the names of the authors rank high among the writers of the day, the illustrations are chiefly by Staniland. Parents and teachers cannot do wrong in selecting presents and prizes from this list.

(1) **Carried off.** A Story of Pirate Times. By Esmè Stuart.

This popular writer has again come to the front with a charming tale of the time of King Charles. The very title suggests all kinds of adventures, no boy will take up the book without a quickening of the pulse, expecting many thrilling accounts of battles, feats of daring, and hair-breadth escapes. We can promise that his anticipations will be fully realised. The scene is chiefly laid in the West Indies, where the pirates attacked the island of St. Catherine. Don Estevan del Campo, the governor, panic-stricken, surrendered, but his brave son Carlo refused to submit, and he and Harry Fenn passed through much tribulation before they were finally rescued by an English man-of-war. Girls will be interested in the adventures of Etta and the Spanish maiden Felipa in all these stirring scenes.

(2) **To Horse and Away.** By Francis Mary Peard.

Any story by this lady is sure to be welcomed by all readers, and we can specially recommend the one before us. It opens in the year 1652 when England was divided into two great parties, and 'men's hearts were aglow with pity, rage or anxiety.' It gives a vivid picture of the perilous time when Charles was a fugitive. How the Royalist family who lived at the Red House suffered for their allegiance to their king, and how he finally escaped to France through the unparalleled devotion of his adherents will be read with deep interest. Diana Amyott is finely drawn, she is deservedly the heroine of the book, and brave hearted little Joyce will be a favourite with every one, the other characters are life-like, and carry the interest on to the very last page. The book is suitable for our elder boys and girls.

(3) **Starwood Hall—A Boy's Adventure.** By the Author of 'A Greek Idyl.'

'Starwood Hall' is simply a tale of adventures that befell a country lad who went to London in the hope of making his fortune. He fell into the hands of a highwayman, but making his escape he at last reached the great city to find it was not paved with gold. The pages of the book are full of incident, boys will like the stir and life. The purpose no doubt is to inculcate contentment with a safe and happy lot, and show the dangers that attend a restless, dissatisfied spirit.

(4) **Mrs. Dimsdale's Grandchildren.** By M. & C. Lee.

This relates the history of a houseful of children during the Christmas holidays—and though this may appear at first a somewhat worn out theme, the characters are so daintily and truthfully sketched in, and the various adventures are described with such freshness and vivacity that we are sure all young readers will be captivated by the book. The illustrations are scarcely up to the level of the writing, though that of the children tobogganing down the stairs on tea trays has caught more of the author's spirit than the rest.

(5) **Our New Mistress.** By C. M. Yonge.

This is a tale with an obvious moral. It is none the less suited to the class of readers for which it is intended, and it will be added with satisfaction by the admirers of Miss Yonge to the large number of volumes she has already contributed to Sunday school and village libraries. Her style is so widely appreciated that we need not point out its many excellencies. Mothers and teachers know full well they can put any book by this author into their girls' hands without hesitation.

(6) **St. Helen's Well.** By Mary H. Debenham.

The story is told by the heroine herself in a simple, attractive manner that will delight young children. She was the daughter of Royalist parents who had to fly from their home after the defeat of the Young Pretender. The nurse took the two children to her home in an obscure village in Wales, here they lived safely for some years, but Nest pined for her lost mother and became seriously ill. Meg dearly loved her sister, and when told by an old Welsh woman that the water from St. Helen's well would certainly cure her, she determined to get some. It was a long and dangerous journey for a child of fourteen through the wild mountains of Wales a hundred and fifty years ago, but her love sustained her, and she safely reached the well. The rest of her adventures and the happy result will be the pleasant lot of many young readers to find out.

(7) **Reuben Everett.** By C. R. Coleridge.

This is the story of a simple country family, the father and mother sterling, steady-going people, contented with their modest lot, unable to understand the restlessness of youth and the desire of their young ones to rise in the world and see more of life than the little village of Ripplehurst contained. They opposed Edward becoming a schoolmaster, and Agnes a pupil teacher, until the rector convinced them of their mistake, but it was with heavy hearts they saw Edward leave the old home for St. Mark's College. When Reuben asked them to let him get work on the line, with a view to being an engine-driver, they utterly refused. The lad could not rest, and eventually ran away from home. The sorrow and trouble this caused, and Reuben's repentance and return home are all graphically described.

(8) **Silver Star Valley.** By M. Bramston.

An admirable book for boys, girls also will read it with avidity. We have followed the fortunes of Ted, the hero, from the first page to the last with real interest, so vividly are the scenes depicted, so natural and life-like are the different characters. Ted has temptations, and, like other boys, sometimes yields to them, he is not too good, but he is a fine fellow, and his efforts 'to keep his heart faithful and his lips true,' will rouse every reader's admiration and affection. The tone of the book is commendable, religious without it being thrust forward too conspicuously. We cordially recommend it for its thoroughly healthy, manly spirit.

Ted is brought up in England till the age of sixteen, he is then sent out to the Far West to his father, who is supposed by his English relatives to be a prosperous farmer. Ted is horrified to find him the keeper of a drinking bar in a mining village, but the father has sufficient knowledge of what is right left in him to place his son with a high-principled Scotch farmer. His life for the next two years is well told, the bear hunt, his courageous rescue of Mercy Malcom, his friendship with Giant Jim, the miner, and successful efforts in saving his father's life, give variety to the narrative. Sweet, motherly Mrs. Malcom is a delightful character. The illustrations do not give our idea of Giant Jim.

A Latin Prose Primer. By J. Y. Sargent, M. A. (Clarendon Press.)

Mr Sargent, whose peculiar skill as a teacher of Latin Prose Composition has long been in great esteem at his own university, has produced in this book a manual for which many a candidate for matriculation will be grateful. It is a book for the learner, perhaps, rather than the teacher; the method it adopts is one which it would be difficult to follow with a large class. For the private student it will be very helpful. The author's plan is to take a piece of English prose—he has chosen the first fifty of the selections printed in the last edition of his 'Easy Passages for Translation into Latin Prose'—and carefully analyse it, sentence by sentence, pointing out where the English prose style differs from the Latin, especially in the formation of periods, and the expression of their logical connexions, and explaining where and why the thought of the writer will require to be expanded or will admit of simpler expression, or will need to be cast in an altogether new mould. This first process he calls the *Praeparatio;* it is followed by the *Constructio*—the whole passage in its new dress; that is to say, as it would appear in a literal English translation from the completed Latin Version; lastly comes the *Materia*, a *catalogue raisonné* of the less familiar expressions, giving alternative Latin words or phrases, and materials to guide the student in his choice. The danger lies in the misuse of the *Constructio*, lest the indolent pupil find it the easier and shorter method to write his exercise straight from the adapted version, and so miss the labour of the conscientious *Praeparatio*, and with it the whole educational value of his work. It is a pity, too, that the English originals are not reprinted in the book; as it is, it can only be employed in conjunction with a copy of the 'Easy Passages.'

Xenophon's Cyropædia. Book I. By C. Bigg, D.D. (Clarendon Press.)

One is inclined to wonder that the Cyropædia—or at least this first book—is so much less read in schools than the Anabasis or Hellenica. The Greek is hardly more difficult, and the subject much more attractive, the story told gracefully, and with humour. On the other hand, the tale of Cyrus' childhood has about it a strong flavour of 'Sandford and Merton,' which is probably less relished now than it was by our fathers. Dr. Bigg in this edition has taken pains to make it easy for his young readers. The text is cut up into sections, each headed by a brief summary of its contents, as 'How Cyrus won all hearts,' 'Why he was more talkative as a boy than as a youth,' 'How Cyrus made his first speech,' and so on. The notes are short and written with careful simplicity; those on varieties and irregularities of grammatical construction are especially commendable in this respect, though some teachers will object to the large amount of direct translation, without further comment, which is given. The introduction might very well have been compressed within narrower limits; twenty pages of preface to seventy of much more widely printed text is surely more than necessary for the purposes of a school edition.

An Introduction to Latin Syntax. By W. S. Gibson, M.A. (Clarendon Press.)

Mr. Gibson's little book is a step in the right direction for the improvement of teaching in the elements of Latin Syntax. His method is to work up from the instances to the general rule, which should be the conclusion and summary of the learner's knowledge of the matter it treats of, and not, as is usually the case, his first introduction to it. In each section he starts with a few short sentences, intended to be translated, parsed, and learned by heart; then comes an analysis of each sentence, in which every difficulty at which experience has shown the learner is likely to stumble, each misconception which will lead him astray, is carefully anticipated and dealt with in the simplest possible language, so that the wayfarer, though a fool, can hardly mistake the right path. Then come the exercises, calling for the application of the newly learned rule. Within the limits which he has set for himself (he stops short of the syntax of the compound sentence) the author has done his work very completely, and the book ought to be serviceable to the teacher as well as to the taught. Only long experience can give the familiarity with the curious incapacities and divagations of a child's intelligence which the author's treatment of his subject shows; and without some such acquaintance with the nature of the material he has under his hand, the teacher, like any other craftsman, is apt to spoil a great deal of it, before he produces a finished piece of work. The arrangement of the vocabulary at the end of the book according to the parts of speech to which the words belong is an ingenious device to counteract a common form of indolence or carelessness in the learner.

Xenophon's Anabasis. Book III. By J. Marshall, M.A. (Clarendon Press.)

This edition is published in two volumes, the one of which contains a vocabulary, the other the introduction, text, and notes. The vocabulary is of the simplest character, giving little beyond the renderings of the words as used in this portion of the author, and some rather scanty grammatical information (no etymologies). Such a vocabulary can only be intended for the service of beginners who have not yet sufficient acquaintance with Greek to use a general Lexicon readily and profitably. But the style in which a good deal of the annotation is written seems inconsistent with the purpose implied in the supply of a vocabulary. Many of the notes, and particularly those which deal with points of syntax, are apparently intended for the use of maturer students, if one may judge from the form in which they are put, and the references to Goodwin's Greek Syntax. But it is open to question whether it is possible to supply the wants of both classes in the same book, without running a risk of adding to the perplexities, and creating needless confusions in the minds of the younger. In other respects the book is well arranged and annotated, the commentary being quite adequate, and at the same time kept within very moderate limits. The introduction contains an analysis of the contents of the text, with some interesting quotations from Layard's work on Nineveh, to illustrate the route taken by the Greeks in the beginning of their retreat.

English Passages for Translation into French. By A. C. Clapin, M. A. London: George Bell and Sons.

A collection of short passages, partly from English authors, partly translated or adapted from the French, and intended for the use of persons preparing for the army and other examinations in which French composition is required. The passages are printed without any annotations for the help of the pupil, and are plainly intended for the use of tolerably advanced students. Curiously, the English author, whose writings are most frequently laid under contribution, is Bulwer Lytton.

Diagrams of Colour: No. 1, Colours and their Combinations; No. 2, Spectrum Analysis. By J. Howard, F.C.S. Edinburgh and London: W. and A. K. Johnston.

These diagrams have evidently been very carefully prepared, and great pains taken in the printing to secure the correct colours. It goes without saying that in the case of spectrum analysis, or indeed of colour combination, a few practical experiments would convey more information, and carry more impressive force, than any amount of wall diagrams; but practical experiments cannot always be carried out, and then it is well to have good diagrams, such as these, to fall back upon.

Sheet No. 1 deals with Colours and their Combinations, and illustrates as vividly as possible the Primary, Secondary, and Tertiary colours, together with sundry peculiar effects consequent on the arrangement of certain colours. Sheet No. 2 is devoted to Spectrum Analysis, and besides giving a very satisfactory representation of the graduation of colours in the solar spectrum and the appearance of Fraunhofer's lines, together with the characteristic spectra of eight or ten of the metals, contains also illustrations of the prism, spectroscope, revolving colour disc, &c. A word of praise, too, must be given to the little handbooks accompanying the diagrams, which in a compendious form supply a considerable amount of useful information.

Natural History Plates. Edinburgh and London: W. and A. K. Johnston.

The four plates now before us are excellent examples of the pictorial assistance which the resources of modern lithography can give to teachers and scholars. It would be somewhat difficult to point out any department of art which can exhibit greater progress during the past forty years than lithography. Not many years ago plates such as these were practically unattainable, except at prohibitive prices. Then the drawing, too, was often erroneous, the colouring fanciful and capricious, and the general result grotesque rather than true to nature. It is indeed somewhat amusing to glance over the illustrations in an old book of natural history and note the quaint way in which some of the delineations were carried out. Now, *tempora mutantur*, and with the times the illustrations. The present plates are admirable in every respect. The colouring is bright and truthful, the drawing accurate, and the general appearance very creditable and satisfactory. The subjects represented are the Giraffe, the Peacock, the Vampire Bat and the Flying Fox, Butterflies and Moths. In the last-mentioned plate the Peacock butterfly and the Swallow-Tailed have been selected to represent the butterflies, and the Death's Head Moth the moths; the caterpillar form and chrysalis state being also illustrated.

Algebraic Factors. By Dr. W. T. Knight. London: Blackie and Son.

A long experience in the examination of papers from pupil teachers and candidates for various examinations has shown us how really few young students are able, adequately, to use the power which ability to factorise would give them. A page of an examination paper is often filled where a line or two would suffice. Dr. Knight's little book contains clear explanations of the methods of finding factors, the way to use them, and in this new edition examples of the method of saving time by their use in the examination room. Drill in the general results observable in multiplication and division in algebra should be as common as is the drill necessary in the tables in arithmetic. Just as the latter is sometimes rather nauseating to the very young pupil, so the former may be; but future success depends almost entirely on the complete mastery of these formulæ, and their application. And when once the pupil has been led to see the use which can be made of them, he will be anxious to exercise his ingenuity with them. Dr. Knight is a pleasant guide to this desirable goal, and the practical application of his teaching to the solution of the examples given in various examinations is a valuable addition to his work. To pupil teachers and young students generally we cordially recommend the book in its new form.

Jackson's Pens for New Style of Upright Penmanship. Nos. 1 to 4. London: Sampson Low and Sons.

Most of our readers have probably seen something of the new style of vertical writing which is taught in a series of copybooks published at St. Dunstan's House. The author of the series of books has provided some pens specially adapted for this kind of writing; and, having given them a fair trial, we are able to state that they serve their purpose remarkably well. No. 1 and No. 4, the latter a correspondence pen, please us best, the others being rather too fine in the point for general use.

Pictorial Astronomical and Geographical Diagrams. Edinburgh and London: W. and A. K. Johnston.

This sheet of diagrams is designed to give pictorial aid in the elucidation of the terms commonly met with in the study of Geography, and although the colouring and general lithographic work is in some respects somewhat rougher and less exact than is quite compatible with the clearness that ought to be aimed at in diagrams for school use, the main defect is that too much has been attempted on the one sheet. There seems to be quite enough subject matter on this one chart to occupy three or four of the same size, if due regard is to be paid to the chief object of wall-sheets—facility of reference in class use., In other respects, such as in selection of terms illustrated and general design and grouping, the diagrams seem all that can be desired.

Royal Star Arithmetics: In Seven Books. London and Edinburgh: T. Nelson and Sons.

The exercises in the earlier numbers of the series are based upon previous mental work—addition, subtraction, multiplication, and division drill being prefixed to the various rules, and often to each page, as required. The Arithmetics are essentially books of examples, as, although definitions and rules are given in some of the later books, no reasons or explanations are added. The books provide an immense number of examples, both mechanical and problematical. They can be had bound together in one volume, uniform with others of the Star series. A good feature is the addition of the rules not included in the usual code work, and twenty pages of rules and examples in the Mensuration of Surfaces in the book for Standard VII. Sufficient practice will be found in them for the year's work, and, if preceded and accompanied by good teaching, the use of the books cannot fail to produce good results.

Coloured Historical Wall Sheets. London: Cassell and Co.

To this really excellent series of cartoons we give our cordial commendation. In pictorial effect and general design they are alike admirable, and as an interesting adjunct to the history lesson they will doubtless give great satisfaction. The following six subjects have thus far been illustrated: The Landing of the Romans in Britain, King John signing Magna Charta, Queen Elizabeth at Tilbury Fort, Cromwell dissolving the Long Parliament, the meeting of Wellington and Blucher, and the Queen arriving at Westminster on the occasion of the Jubilee; and other cartoons are, we are led to understand, in course of preparation. If the high standard of excellence observable in these commencing cartoons is maintained in subsequent issues, the publishers may be congratulated on having practically inaugurated a new era in the history of school wall decoration.

The Elements of Logarithms, with the Sandhurst and Woolwich Questions, 1880—87. By G. W. Gallatly, M.A. F. Hodgson.

This is a pamphlet of 30 pages excellently printed on good paper. It consists, as might be expected, of the ordinary propositions on the nature and use of logarithms. The explanations are often fuller than usual; the demonstrations are neat and clearly arranged. What will make the book very useful to students is the abundance of fully worked out examples. These are models in the best sense. They are logically arranged and easy to follow. In addition to the examples in the text, the questions set at the recent examinations are appended, and, what will be found most useful, the answers to them. We feel sure that this little work will have a large circulation. It deserves it. The author asks for suggestions. We think the advantages of the common system might be set out a little more strikingly. It might also have been more clearly stated when the Napierian logarithms are used.

Slojd. By Emily Lord. Cassell and Co.

A sixpenny pamphlet, written to show that the handcraft known as Slöjd is a means of teaching the essential elements of education. This is of course a great claim. To our minds the author does not make it good. She quotes from the author of the system, and tells us that 'manual instruction should aim principally at instilling a taste for and love of work in general; inspiring respect for rough, honest, bodily labour; training in habits of order, exactness, cleanliness, and neatness; accustom him to attention, industry, and perseverance; promoting the development of the physical powers; affording a training of the eye in the sense of form. Manual training must exercise the thinking power, and not be purely mechanical. There must be no division of labour, and so it must correspond with the capability of the child. Lastly, and as one of the aims is to cultivate general dexterity of the hands, that material must be employed which permits of the use of numerous manipulations and of various tools.' One feels, in reading all this, that there is a want of perception of the end to be attained and of the means for attaining it. Surely it might be claimed for a dozen things that they would promote exactly the same virtues which are here enumerated. Perseverance, industry, attention, neatness, cleanliness, are elementary virtues in which Englishmen have never been wanting. Nor can it be said that any system of wood-carving can afford such an accurate training of the eye as drawing and modelling. For many years past teachers have been suffering from the too enthusiastic and exaggerated advocacy of Frœbel's Kinder Garten. We seem to be gradually absorbing what is really essential in it, but it is taking a long time. And it may be that we have to go through a similar period of experiment and criticism of the various plans of manual instruction now before the public. We do not profess to see more clearly than others, and we may be wrong, but it does seem to us that what is really desirable lies within narrow bounds. We want first of all that a child shall be able to see what others too see, and that with a pencil he can represent what he sees; and we want to develop between the age of five and fifteen that nimbleness of finger and dexterity of hand which are indispensable in nearly all subsequent manual operations. There is at the present time accumulating scientific evidence that this nimbleness must be acquired in early life, or it can never be acquired to perfection at all; and apart from scientific evidence we have the testimony of experience, for in the case of such operations as require marvellous feats of manual skill the accomplishment has been in all cases acquired in early life. The glass blower begins when he is a boy, and every great pianist has begun when quite a child. We are therefore come to the conclusion, that if drawing and modelling were made universal and compulsory much would be done to secure the perfect training for both hand and eye. That a good deal might be done, in the case of boys, in the way of teaching them the use of simple tools, whether for the Slöjd training or ordinary carpentry, we do not for a moment doubt; indeed, we have seen the interest it creates, the health and intelligence it promotes. At present, however, we regard the subject as under discussion, and we do not admit that there is any perfect or complete system in the field.

Euclid. Books I.—VI. By H. S. Hall, M.A., and F. H. Stevens, M.A. Macmillan and Co.

The authors of this book are by this time pretty well known to teachers of Mathematics. They have given us in the book before us the first six books of Euclid's elements, together with the most important elementary developments of Euclid's Geometry. There has been very little alteration in the enunciations, and except in Book V. few departures from Euclid's proof. In Book I. the authors have used no contractions or symbols of any kind, but in the third and following Books all such signs and abbreviations as were thought to add to the clearness of the reasoning have been introduced. There is unfortunately at the present time a want of uniformity among mathematicians of eminence in regard to the more or less brevity admissible in writing out geometrical propositions. Some are always complaining that the propositions are too concisely stated. Others declare that Euclid's proofs as they are frequently printed are needlessly cumbrous and prolix. The authors would seem to incline to the latter view. Perhaps the most important part of the book consists in the additional matter, and the excellent set of graduated exercises upon the Propositions. We are glad to see that they refer to an edition of Euclid's Elements prepared by Mr. J. S. Mackay and published by Messrs. Chambers—a most excellent book, which we have often referred to with uniform pleasure and profit. There can be no doubt that this book will increase the reputation of the authors both as teachers and writers. Diagrams, the arrangement of the Propositions, the type, printing, and paper—all combine to make this one of the most attractive books on Geometry that has yet fallen into our hands.

Examples in Physics. By D. Jones, B.Sc. Macmillan and Co.

This is a book of 246 pages, excellently printed and bound. It professes to give a set of useful examples, followed by specimens and examination questions of greater difficulty upon all the subjects usually studied in a full course of Physics. But it is by no means a mere collection of examples. It commences with a clear though concise account of units fundamental and derived, and the dimensions of physical quantities. It gives enough of the theory of the subjects treated of to enable a student to work the examples set. There are ten chapters; one on each of the following subjects:—Dynamics; Hydrostatics; Heat; Expansion; Physical and Latent Heat; Conductivity and Thermal Dynamics; Light; Sound; Magnetism; Electrostatics and Current Electricity. There are, of course, in many of the best works on Physics sets of examples; the book is therefore not wholly new, and there is little therefore in the book that is quite new. But it is often convenient to have an excellent question logically arranged, and we therefore think this book will meet a want often felt, and we believe it will be found highly useful. There is one danger which we cannot but point out to a student who uses such a book. He must on no account rest satisfied with ability to answer the questions in it, but should, as far as possible, repeat many of the experiments involved in the questions himself, even though his results should be only approximately true.

The Building of the British Isles.—A Study in Geographical Evolution. By A. J. Jukes-Browne, B.A., F.G.S. London: George Bell and Sons.

We have to acknowledge the thorough satisfaction with which we have read through the pages of this delightful book. The attempt to realise the successive appearances which our island home has presented since its foundations were laid in the Palæozoic rocks of the west has been made with the most pleasing result. The author sets out with the acknowledged truth that the existing geographical and physical contours of the British Isles are the outcome of the long and varied geological history which this particular part of the world possesses. We are then introduced in turn to the magnificent and almost complete series of rocks which find a place in some part or other of the British area, and under the guidance of a master-hand we are enabled 'to picture out' the manner in which each was formed, together with the physical and geographical conditions which Britain for the time being possessed. In the effort the reader is very greatly assisted by no less than fifteen full-page maps, showing most vividly that there have been many different arrangements of land and sea over the area where the British Isles now stand; that every part of our country has been repeatedly depressed beneath the sea—some portions much more frequently than others—and conversely every part of the area which is now covered by the environing seas has more than once been part of the dry land; that sometimes nearly the whole area has formed part of continental land, and at other times it has been almost entirely submerged beneath the sea. The stories of vanishing continents, whose highest summits slowly and with apparent reluctance disappear; of emerging land, whose monotonous outline as it continues to rise is carved by the ever active agents of waste into variety and beauty of contour; these are told with scientific precision and fairy-like effect. Take for example the last great movement which affected the area of Great Britain:

> 'So long as the British coast-line lay near the contour of 80 fathoms, our modern streams were but tributaries of the three great rivers which ran outside the present limits of Great Britain; that to the east being a continuation of the Rhine, that to the south a prolongation of the Seine, and that to the west a river to which no modern name can be applied, but of which all the rivers of western England, southern and eastern Ireland, were the tributaries.
>
> 'It was not long, however, before a movement set in, and subsidence caused a rapid recession of the coast line; the North Sea crept southward over the plains between England and Holland, while the Atlantic crept round Ireland and up the valley of the English channel till only a narrow isthmus separated England from France. It is not unlikely that the actual straits are the site of a valley formed by a river which ran northward nearer France than England, and cut through the northern escarpment of the chalk as the Stour and Medway do at the present day, while a second stream ran south-westward, nearer the British coast, and cut through the continuation of the South Downs east of Beachy Head. The watershed between these two rivers is possibly marked by the line of sandbanks which runs southward from the Varne Bank.... Subsidence under these circumstances would enable the sea to creep up the valleys of the two rivers, and eventually to submerge part of the low watershed between them. Waves and currents would soon widen the breach, and THESE HAVE CONTINUED TO WIDEN IT FROM THAT TIME TO THE PRESENT DAY.'

Thus was Britain finally separated from the continent to which it had been united throughout the greater part of Tertiary time, and thus was the geographical evolution of the British Isles at length accomplished.

The reader who for the first time becomes acquainted with the unstable condition of the solid earth, and whose faith in the everlasting hills becomes thereby weakened, may, perhaps, find sufficient to still his misgivings in the following paragraph:—

> 'Minor changes are even now in progress, and there is no reason to suppose that the present arrangement of land and sea is the final geographical condition of Europe, or that the British Isles will never again be subjected to movements of upheaval and depression like those which they have experienced in the past. It is very probable, however, that the period in which we are now living is one of those quiescent times which, as we have seen, generally succeed periods of rapid movement and disturbance. The earth's crust appears to be in a comparatively fixed and stable condition, and the movements which are known to be in progress are so slight, or rather the rate of change is so slow in relation to the short span of human life, that we may safely rely on the permanency of the present geographical conditions for a very long period of future time.'

Sonntag's French Grammar: Part III. London: Blackie and Son.

The third part of this grammar is continued on the same lines as the two preceding parts, abundant exercise in the use of new grammatical forms being provided on their introduction. It is an eminently practical grammar.

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Pestalozzi.

BY THE REV. CANON WARBURTON, M.A.,
Formerly Her Majesty's Inspector of Training Colleges for Schoolmistresses.

CHAPTER VI.—*continued.*

(3.) The concluding clause of the last Pestalozzian axiom may best be taken in close connection with the next, namely, that *all education must be founded on observation.*

Early introduced to the materialistic philosophy of the French school, Pestalozzi held strongly, perhaps too strongly, with our own countryman Locke, that *all* human knowledge is derived from the senses. The powers of perception were, therefore, what was first to be cultivated;—the senses themselves cannot be developed without education; we must be taught how to feel, to see, to touch, and to hear; and the child's best first text-book is the world. Examples must be drawn from familiar objects; things must be learned before words; facts and qualities must be apprehended before we attempt to form, or even to learn, definitions. All knowledge is comparatively worthless which is merely bookish and verbal, and not based upon actual experiences; and these may be acquired either by the intelligent observation of the individual, or by an abridgment of the natural process, *i.e.*, by a vivid and methodical presentation of the facts to the learner's mind by a skilful teacher. 'In book learning there is always a danger that the thing signified may not be discerned *through the sign.* The objects of a child's instruction should constantly be brought under its eyes. So Pestalozzi was careful to devise lessons on 'objects,' in which, by actual contact with the sense, the children were led to discern qualities which they afterwards described in words. To the young, the truth bare before the sight, palpable to the touch, embodied in forms which the senses realise, has a charm which no mere *words* can convey, until they are recognized as the *sign* of the truth which the mind comprehends. In all that relates to the external world the best book is Nature, with an intelligent teacher. The master who neglects his opportunities of satisfying the intelligence of his pupils on anything that can be made obvious to the sense, must be content to find that when his lessons rise to abstractions, he will be gazed upon by vacant faces. The mind will refuse a lively confidence in general truths when it has not been convinced of the existence of the particular facts from which they are derived.'* Thus, then, the teacher, having laid a foundation of fact apprehended and tested by the senses, advances from the known to the unknown, from the simple to the general, from the concrete to the abstract, never moving a step forward till the preceding foothold is secure,—and the pupil, following his guidance, and having no false steps to retrace, is enabled, without straining his faculties, to arrive at results which might otherwise have been difficult, or slow, or impossible of attainment.

Lastly, *All education is imperfect without due attention to the training and development of the physical powers.*

The faculties of the mind are often clouded by bodily disease or by confinement, or even by want of proper exercise. Hence the importance of providing suitable apparatus, and setting apart regular times, for gymnastic exercises; of attending to ventilation, light, temperature, wholesome food, and proper clothing—it remained for the English Pestalozzianism of the future to add,—*above all, to cleanliness.*

Such, in rough outline, are the main features of the system of Pestalozzi, namely the development, natural, progressive, and harmonious, of the intellectual, moral, and physical powers, in an atmosphere of mutual trustfulness and simplicity, under the sunshine of sympathy and love.

If it be asked, as it is fair to ask in the case of a man so respected and renowned, 'what permanent benefits has Pestalozzi conferred upon mankind?' it may fairly be answered—first, that though he may not have been the actual discoverer of the great truths which he enunciated, they were, with him, the fruits of original research, and he was the first to popularise them, to bring them down to the public schoolroom, and apply them for the improvement of the masses. He is, therefore, justly entitled to be called the father of Poor School Education. Again, 'he was the first to define fully and clearly the work of the schoolmaster, to give him the highest aim, and bid him measure his modes of education by it, to inspire him with the right spirit, and enable him to proceed in his work with all the certainty of the light of science, and give a reason for every part of his procedure.'* Once more, he called attention to the fact that education, to be successful, must aim at assisting the natural expansion of the innate powers of the mind, and this in their proper order of development;—and that perception, being the earliest born of these powers, must be the first to be cultivated. If he failed to see with sufficient clearness that some truths are in their nature axiomatic, self-evident, and intuitive, while some must rest on authority and the testimony of others, he did good service in making it clear that the great mass of human knowledge is undoubtedly derivable from observation, and only so far trustworthy, as it has been, or can be, tested and verified by experiment. Lastly, he inculcated by reiterated precept, and still more by example, an almost unlimited faith in the educative power of sympathy and trust, of love and patience and self-devotion. It is no exaggeration, but the literal truth, that he gave his life for the lambs of the flock.

---

* Sir James Shuttleworth.

It would be easy enough to find faults in his views, and to call them, as some have done, unscientific, one-sided, and even mutually contradictory; but those who have any acquaintance with the Elementary Schools of to-day will hardly need to be told how completely those views have interpenetrated our modern system, and how beneficial their influence upon it has been.

Those results, indeed, it was not granted to Pestalozzi himself to see. Like the dying Lawgiver of Israel, he had led a younger generation to the borders of a Promised Land, into which he was not permitted himself to enter,— and lay down to die amid the apparent collapse of all his undertakings. But he found his consolation in the unshaken hope of the wide future expansion and dissemination of his ideas,—in the 'Pisgah-prospect' of the rich inheritance which lay before those who had followed him faithfully through the stony wilderness of his disappointed career. There is, perhaps, nowhere to be found a more affecting memorial of a crushed and bleeding, but still indomitable faith, than the following passage from a letter of Pestalozzi's, which was found among the papers of a friend: 'Let me now for a moment forget my aim and my labours, and abandon myself to the melancholy which comes over me when I remember that I still live, though I am no longer myself. I have lost everything, I have lost myself: nevertheless Thou, O Lord, hast preserved in me the longings of my life, and hast not shattered to pieces before my eyes the aim of my sufferings, as Thou hast shattered the aims of thousands who have corrupted themselves in their own ways. Thou hast preserved to me the work of my life in the midst of my own ruin, and hast caused to arise upon me in my hopeless declining age an evening brightness, and the sight of its loveliness outbalances the sufferings of my life. Lord, I am not worthy of the mercy and faithfulness which thou hast shown me. Thou alone hast had pity on the trampled worm; Thou alone hast not broken the bruised reed; Thou alone hast not quenched the smoking flax; and hast not to the latest period of my life, turned away Thy face from the offering, which from childhood, I have tried in vain to bring to the forsaken in the land.'

(The end.)

---

* Mr. Dunning.

The Glass of Water; or, Cause and Effect.

(Comedy in Five Acts.)

LE VERRE D'EAU; OU, LES EFFETS ET LES CAUSES.

(Comédie en Cinq Actes.)

Act IV.

Scène I.	Scene I.
La Duchesse.	The Duchess.

The Duchess.

C'est inouï !...	It is unheard of (wonderful)!
Pour la première fois de sa vie	For the first time in her life
elle avait une volonté...une volonté réelle !	she had a will of her own.
Faut-il l'attribuer aux talents de Bolingbroke ?...	Must I attribute it to the tact of Bolingbroke ?
Ou serait-ce déjà l'ascendant de cette petite fille ?	Or can it be that it is already the ascendancy of this little girl ?
(*D'un air de mépris.*) Allons donc !	(*With a look of contempt.*) It cannot be !
(*Après un instant de silence.*) Je le saurai !...	(*After a moment of silence.*) I will know it.
En attendant et tout à l'heure,	Meanwhile, and just now,
en sortant de la chapelle où toutes deux,	on coming out of the chapel in which we both,
je crois, nous avons prié avec le même recueillement...	I believe, prayed with the same calmness,
elle était seule...	she was alone.
Bolingbroke et Abigaïl n'étaient plus là...	Bolingbroke and Abigail were no longer there,
et elle a résisté encore !	yet she still resisted
et il a fallu employer les grands moyens...	and I was obliged to employ powerful means.
Ce bill pour le rappel des Stuarts...	This bill for the recall of the Stuarts --
J'ai promis	I have promised
qu'il passerait aujourd'hui même à la Chambre...	that it shall pass this very day the House—
si le marquis partait...et j'ai ses passe-ports...	if the Marquis set out—and I have his passports--
je les ai...pour demain seulement...	I have them—but only for to-morrow.
Vingt-quatre heures de plus, peu importe !	But twenty-four hours more are of little consequence.
Mais tout en signant,	But even while signing,
la reine qui ne tient à rien ...	the Queen who has no perseverance in anything,
pas même à sa mauvaise humeur...	not even in her ill-humour,
a conservé avec moi	still cherished against me
un ton d'aigreur et de sécheresse	a tone of bitterness and coldness
qui ne lui est pas ordinaire...	which is not customary with her.
Il y avait de l'ironie, du dépit...	There was irony, vexation (spite),
une colère secrète et concentrée	secret and concentrated anger
qu'elle n'osait laisser éclater ...(*En riant.*)	which she dared not suffer to explode. (*Laughing.*)
Décidément, elle déteste sa favorite !...	Decidedly, she detests her favourite !
je le sais, et c'est ce qui fait ma force !...	I know it, and it is that which constitutes my strength.
La faveur basée sur l'amour s'éteint bien vite !...	Favour based upon love is quickly extinguished,
mais quand elle l'est sur la haine...	but when it is based upon hatred

cela ne fait qu'augmenter...	it only goes on increasing,
et voilà le secret de mon crédit...	and that is the secret of my influence.
Qui vient là?... Ah! notre jeune officier.	Who comes there? Ah! our young officer.

Scène VII.	Scene VII.
La Duchesse, Bolingbroke.	The Duchess, Bolingbroke.

* * * * * * *

Bolingbroke.

Bien entendu qu'en échange	It being well understood that in exchange
je vous en rendrai un autre plus grand encore...	I shall render you another still greater—
c'est notre seule manière de traiter ensemble!	that is our only manner of treating together.
Tout l'avantage pour vous...	All the advantage for you,
deux cents pour cent de bénéfice...	two hundred per cent interest—
comme pour mes dettes.	as with my debts.

The Duchess.

Milord aurait-il encore intercepté ou acheté, quelque billet?...	Has my lord perchance intercepted or bought some note?
Je le préviens que	I warn him that
j'ai pris des mesures générales et définitives	I have taken general and definite measures
contre le retour d'un pareil moyen.	against the return of such means.
J'ai plusieurs lettres charmantes	I have several charming letters
de milady vicomtesse de Bolingbroke votre femme...	of the Countess of Bolingbroke, your wife.
(*à demi-voix et en confidence*)	(*in a low voice and confidentially*)
je les ai obtenues de lord Evandale...	I obtained them from Lord Evandale.

Bolingbroke.

[*de même et souriant.*	[*the same and smiling.*
Au prix coûtant, sans doute?	At cost price, no doubt?

The Duchess.

[*avec colère.*	[*angrily.*
Monsieur!	My lord!

Bolingbroke.

N'importe le moyen!...vous les avez...	No matter by what means —you have them—
et je ne prétends pas vous les ravir...	and I do not wish to wrest them from you
ni vous menacer en aucune sorte!...	nor to threaten you in any way.
au contraire, quoique la trêve soit expirée...	On the contrary, although the truce has expired,
je veux agir comme si elle durait encore,	I wish to act as if it still existed,
et vous donner, dans votre intérêt, un avis...	and to give you, in your own interest, a piece of advice.

The Duchess.

[*avec ironie.*	[*ironically.*
Qui me sera agréable?	Which will be pleasing to me?

Bolingbroke.

[*souriant.*	[*smiling.*
Je ne le pense pas!	I do not think it will,
et c'est peut-être pour cela	and it is perhaps for that reason
que je vous le donne.	that I give it you.
(*A demi-voix*) Vous avez une rivale!	(*In a low voice*) You have a rival.

The Duchess.

[*vivement.*	[*quickly.*
Que voulez-vous dire?	What do you mean?

Bolingbroke.

Il y a une lady à la cour	There is a lady at the court,
une noble dame qui a des vues sur le petit Masham.	a noble lady, who has her views concerning Master Masham.
Les preuves, je les ai.	The proofs (you demand)—I have them.
Je sais l'heure, le moment,	I know the hour, the moment,
le signal du rendez-vous.	and the signal for the appointment.

The Duchess.

[*tremblante de colère.*	[*trembling with anger.*
Vous me trompez...	You are deceiving me.

Bolingbroke.

[*froidement.*	[*coldly.*
Je dis vrai...	I speak the truth.
aussi vrai que vous-même l'attendez ce soir	It is as true as that you yourself expect him this evening
chez vous après le cercle de la reine...	in your apartments after the Queen's party (levee).

The Duchess.

O ciel!	Oh heavens!

Bolingbroke.

C'est là, sans doute, ce que l'on veut empêcher...	That is what, no doubt, your rival (*l'on*) wishes to prevent,
car on tient à vous le disputer...	for they are resolved to contest him against you
à l'emporter sur vous...	and carry the day against you.
Adieu, madame.	Adieu, Duchess.
(*Il veut sortir par la porte à gauche.*)	(*He is going out by the door on the left.*)

The Duchess.

[*avec colère et le suivant jusque près de la table qui est à gauche.*	[*angrily following him to the table on the left.*
Ce que vous disiez tout à l'heure...le lieu...	What you said just now—the place—
du rendez-vous?...le signal? ...parlez!...	of the rendezvous—the signal?—Speak!

Bolingbroke.

[*lui présentant la plume qu'il prend sur la table.*	[*handing her the pen which he takes from the table.*
Dès que vous aurez écrit cette invitation au marquis de Torcy.	The moment you have written this invitation to the Marquis of Torcy.
(*La duchesse se met vivement à la table.*)	(*The Duchess hastily seats herself at the table.*)
Invitation de forme et de convenance.	An invitation merely for the sake of form and propriety,
qui, en accordant au marquis les égards	which, while granting to the marquis the regards
et les honneurs qui lui sont dûs,	and the honours which are due to him,
vous permet de rejeter ses propositions	permits you to reject his proposals
et de continuer la guerre avec lui...	and continue the war with him
comme avec moi...	as well as with me.
(*Voyant que la lettre est cachetée, il sonne. Un valet de pied paraît. Il lui donne la lettre.*)	(*Seeing that the letter is sealed, he rings. A footman appears to whom he gives the letter.*)

Ce billet au marquis de Torcy ...hôtel de l'Ambassade...	This note to the Marquis of Torcy at the ambassadorial residence
vis-à-vis le palais...	opposite the palace.
(*Le valet de pied sort.*)	(*The footman goes off.*)
Il l'aura dans cinq minutes.	He will have received it in five minutes.

* * * * * * *

Scène VIII.	Scene VIII.
Les mêmes, Abigaïl va ouvrir les portes du fond.	The same, Abigail goes and opens the doors in the background.
Paraissent la duchesse de Marlborough et plusieurs seigneurs de là cour ;	Appear the Duchess of Marlborough and several lords of the court ;
Bolingbroke entre après eux.	Bolingbroke enters after them.
Abigaïl va également ouvrir la porte à droite,	Abigail goes and opens also the door on the right,
d'ou sortent plusieurs demoiselles d'honneur.	through which appear several maids of honour.

The Queen.

Qui ose ainsi, à cette heure... dans mes appartements...	Who dares thus, at this hour, into my apartments!
Ciel ! la duchesse...Une pareille audace !...	Heavens !- the Duchess—such audacity !

The Duchess.

[*regardant autour d'elle dans l'appartement.*	[*looking round the apartment.*
Me sera pardonnée par Votre Majesté,	Will be pardoned me by your Majesty,
car il s'agit d'importantes nouvelles...	for it is a question of the most important news,
d'où dépend le salut de l'État !	on which the safety of the State depends.

The Queen.

[*avec impatience.*	[*impatiently.*
Lesquelles ?	What news ?

The Duchess.

[*examinant toujours l'appartement.*	[*still examining the room.*
Des nouvelles qui mettent en rumeur...	News which stir up rumour
et agitent tout la ville...	and excite the whole town.
(*A part, regardant le balcon.*)	(*Aside, looking at the balcony.*)
Il ne peut être que là. (*Haut.*)	He can only be there. (*Aloud.*)
Lord Marlborough m'apprend que l'armée française	Lord Marlborough informs me that the French army
vient d'attaquer à Denain les lignes du prince Eugène,	has just attacked at Denain the lines of Prince Eugene
et a remporté une victoire complète.	and gained a complete victory.

Bolingbroke.

[*froidement.*	[*coolly.*
C'est vrai !	That is true.

The Duchess.

[*courant à la fenêtre. Abigaïl fait quelques pas pour la retenir et se trouve ainsi placée entre la duchesse et la reine.*	[*running to the window. Abigail takes a few steps to prevent her and finds herself placed between the Duchess and the Queen.*
Tenez...entendez-vous les cris furieux de ce peuple !...	Listen ! Do you hear the furious shouts of the people ?

Bolingbroke.

Qui demande la paix !...	Who clamour for peace,

The Duchess.

[*qui vient d'ouvrir la fenêtre, et poussant un cri.*	[*who has just opened the window and uttering a cry.*
Ah ! monsieur Masham... dans l'appartement de la reine !...	Ah ! Mr. Masham—in the Queen's apartment !

The Queen.

[*à part, et voyant paraître Masham.*	[*aside, and seeing Masham come forth.*
C'est fait de moi !	I am undone (it is all over with me).

Abigail.

[*bas à la reine.*	[*low to the Queen.*
Non...je l'espère !...	No, I hope not !
(*Tombant à ses genoux.*) Grâce, madame!...grâce!...	(*Falling on her knees.*) Pardon, madam, pardon,
c'est moi qui à votre insu... l'avais reçu cette nuit...	it is I who, unknown to you, had received him here this night.

The Duchess.

[*avec colère.*	[*angrily.*
Quelle audace !...Vous osez soutenir...	What audacity. You dare assert—

Abigail.

[*baissant les yeux.*	[*lowering her eyes.*
La vérité !	The truth !

Masham.

[*s'inclinant.*	[*bowing.*
Que sa Majesté nous punisse tous deux !	Let her Majesty punish us both.

The Queen.

[*bas à Bolingbroke.*	[*low to Bolingbroke.*
Bolingbroke, sauvez-nous !	Bolingbroke, save us !

Bolingbroke.

[*s'avançant vers les seigneurs de la cour qui sont dans le fond et prenant le milieu du théâtre.*	[*advancing towards the lords of the court who are in the background and taking the middle of the stage.*
Permettez!...J'ai à vous dire...	Allow me. I have a few words to say to you—

The Duchess.

[*s'adressant à Bolingbroke.*	[*addressing Bolingbroke.*
Et moi...Je demanderai à milord, comment un prisonnier	And I also—I would ask his lordship, how (it happens that) a prisoner
confié à sa garde est libre en ce moment,	confided to his charge is at this moment
et par quel motif?	free, and for what reason ?

Bolingbroke.

[*se tournant vers l'assemblée.*	[*turning towards the assembly.*
Un motif auquel vous auriez tous cédé comme moi,	A reason to which you all would have yielded as I did.
milords ! monsieur Masham m'a demandé,	My lords, Mr. Masham asked me,
sur sa parole et sur son honneur de gentilhomme,	on his word of honour and on his honour as a nobleman,
la permission. de faire ses adieux à Abigaïl Churchill, sa femme !	permission to bid farewell to Abigail Churchill, his wife.

The Queen and the Duchess.

[*poussant un cri.*	[*uttering a cry.*
O ciel !...	Oh, heavens !

The Queen.

[*avec agitation.*	[*agitatedly.*
Messieurs ... (*Leur faisant signe de s'éloigner.*)	Gentlemen (*signing to them to retire.*)
Un instant...je vous prie !...	One moment, I pray you.
(*Ils s'éloignent tous de quelques pas;*	(*All retire some steps;*
la reine reste seule sur le devant du théâtre avec Bolingbroke.)	*The Queen remains alone in front of the stage with Bolingbroke.*)

The Queen.

[*à demi-voix.*	[*in a low tone.*
Ah, qu'avez-vous fait?...	Oh ! what have you done?

Bolingbroke.

[*de même.*	[*the same.*
Vous m'avez dit de vous sauver...	You asked me to save you.
(*A la reine qui ne peut cacher son émotion.*)	(*To the Queen, who cannot conceal her emotion.*)
Allons, ma souveraine...et puis,	Courage, my Sovereign, and besides,
fallait-il laisser déshonorer cette jeune fille	could you allow such dishonour to fall on that young girl
qui venait de se dévouer pour Votre Majesté?	who had just sacrificed herself for your Majesty?

The Queen.

[*avec courage et comme ayant pris sa résolution.*	[*courageously, and as if having formed her resolution.*
Non...(*à demi-voix*) dites-leur d'approcher.	No—(*in a low voice*) tell them to approach.
(*Bolingbroke fait un signe; Abigaïl et Masham,*	(*Bolingbroke makes a sign: Abigail and Masham,*
qui s'étaient tenus à l'écart, l'avancent timidement.)	*who had kept at a distance, advance timidly.*)

The Queen.

[*avec émotion et à voix basse à Abigaïl.*	[*with emotion, and in a low voice to Abigail.*
Abigaïl...ce que vous venez d'entendre...	Abigail, what you have just heard—
il faut que cela soit...ne le démentez pas...	it must be so—do not say no.
Encore cette preuve de dévoûment...et ma reconnaissance...	This one more proof of your devotion—and my gratitude,
mon amitié vous sont à jamais acquises...	my friendship are for ever yours.

Abigail.

[*à la reine, avec épanchement.*	[*to the Queen, with effusion.*
Ah ! madame ... si vous saviez...	Ah ! madam, if you knew—

Bolingbroke.

[*lui coupant la parole.*	[*cutting her short.*
Silence !...	Hush !
(*Il fait un signe à Masham qui à son tour s'avance près de la reine.*)	(*He makes a sign to Masham who in his turn advances to the Queen.*)

The Queen.

Quant à vous, Masham...	As for you, Masham—

Bolingbroke.

[*bas à Masham.*	[*low to Masham.*
Refusez !	Refuse !

The Queen.

Je sais que d'autres idées, peut-être...	I know that other ideas, perhaps—
mais, par le dévoûment que vous lui portez...	but, by the devotion which you bear her—
votre reine vous le demande...	your Queen asks it of you.

Masham.

Moi, madame...	I, madam—

The Queen.

Elle vous l'ordonne.	She commands you.
(*Tous deux s'inclinent et passent à droite du théâtre.*)	(*Both of them bow and pass to the right of the stage.*)

The Queen.

[*s'adressant aux personnes de la cour*	[*addressing the people of the court*
et prenant le milieu du théâtre.	*and taking the middle of the stage.*
Milords et messieurs,	My lords and gentlemen,
les graves évènements que madame la duchesse	the grave events which the Duchess
vient de nous apprendre	has just communicated to us
vont hâter des mesures	will hasten measures
que nous méditions depuis longtemps.	which we contemplated long ago.
Sir Harley, comte d'Oxford, et lord Bolingbroke,	Sir Harley, Earl of Oxford, and Lord Bolingbroke,
mes nouveaux ministres,	my new ministers,
vous expliqueront demain nos intentions.	will explain to you our intentions.
Nous rappelons milord duc de Marlborough	We recall the Duke of Marlborough
dont le talent et les services deviennent désormais inutiles,	whose skill and services become henceforth of no use,
et, décidée à une paix honorable,	and (having) decided on an honourable peace,
nous entendons que, dans le plus bref délai,	it is our pleasure (*entendons*) that, with the shortest delay,
les conférences s'ouvrent à Utrecht,	the Conferences should open at Utrecht,
entre nos plénipotentiaires et ceux de la France.	between our plenipotentiaries and those of France.

Bolingbroke.

[*qui est placé à droite entre Masham et Abigaïl, bas à Abigaïl.*	[*placed on the right between Masham and Abigail, in a low tone to Abigail.*
Eh bien, Abigaïl ... mon système n'a-t-il pas raison?	Well, Abigail, is not my system right?
Lord Marlborough renversé ...l'Europe pacifiée...	The Duke of Marlborough overthrown, Europe pacified.

Masham.

[*lui remettant les papiers que la reine a signés.*	[*giving him the papers the Queen has signed.*
Bolingbroke, ministre !	Bolingbroke, minister !

Bolingbroke.

Et tout cela, grâce à un verre d'eau !	And all that, thanks to 'A Glass of Water.'

(*The end.*)

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,
Ex-President of the N.U.E.T.

VIII.

AMONG the exercises in Composition at an examination subjects of a familiar nature are often given in the broadest and most general terms. Thus the candidate may be asked to write an essay on 'Railways,' 'the Post Office,' 'the Electric Telegraph,' 'Strikes,' or 'Newspapers.' One advantage attending the choice of a subject of this character is that every one who is able to enter for an examination at all must be able to write something about the matter. But to many persons the extent of the subject constitutes a difficulty. To deal with it in anything like a complete or exhaustive manner in an examination paper is out of the question; and even in the work of preparing for an examination the student would not be likely to find time or opportunity for writing essays on so extensive a scale. Exhaustive treatment of any suject of this kind would require a volume.

Under these circumstances the candidate or student may adopt either of two courses. He may choose to consider the subject from some special point of view suggested by his own previous knowledge or experience, or he may treat the matter in a general way, touching lightly on several points connected with the subject. If he chooses the former plan, he should at the outset state the limitation he proposes to place upon the subject in his treatment of it. Thus, if the subject of his essay be 'Newspapers,' he may consider them historically and trace the growth of the press; or he may adopt the explanatory method and show what newspapers are, what they contain, and what purposes they serve; or again, he may treat of the production of newspapers, the literary work of editors and reporters, the manual and mechanical work of printing, folding, and so on; he may make a special point of the varities of newspapers, the dailies, weeklies, general newspapers, local newspapers, trade, class and professional papers; or he may consider the influence of newspapers on society, or on the individual reader.

We propose to complete this paper with a specimen essay on 'Newspapers,' adopting the more general treatment, and taking the above suggestions for various aspects of the subject as a sort of outline to work upon. In this way the student may see how the amplification of any one portion might serve to make an essay of a special character, and the candidate may observe that with a little modification a single division of the essay might in itself serve to comply with the requirement of some examination where only a short time is available for producing an essay.

NEWSPAPERS.

Newspapers are distinctly a feature of modern civilised life. Before the invention of printing newspapers could not exist, and for a long time after they did not. It used to be said that the oldest English Newspaper was the 'English Mercurie,' bearing date 1588, and giving an account of the Spanish Armada; but it has since been proved that the numbers of this paper were forgeries of a later date. Various newspapers were published in the reign of James I, but they appeared at irregular intervals. In the Stuart period a considerable development took place, and newspapers, or news letters, as they were often called, became regular publications. 'The Spectator' of Steele and Addison, 'The Tatler,' and 'the Rambler' of Doctor Johnson, give us some idea of the family newspaper of the early part of the eighteenth century. In these, however, political controversy was for the most part expressly avoided. It was not till the time of the American war of Independence, rather more than a hundred years ago, that the newspaper assumed anything approaching its present character. Then, though consisting of only four pages, it became, as Cowper calls it in his poem 'The Task,' 'a busy map of life.' Then the 'Morning Chronicle,' the 'Morning Post,' and the 'Times' began their career. The abolition of the newspaper stamp, of the tax on advertisements, and later of the paper duty, have in the present century combined with the progress of mechanical science and the increased facilities for communication to make newspapers more numerous and more influential.

What a modern newspaper is, can be best understood by examining one. When we hastily glance over a column or two during the morning meal, we rarely reflect on the mass of matter it contains. Indeed we often say with a tone of disappointment: 'there is nothing in the paper this morning.' But it is worth while to think that a number of the 'Times' which not unfrequently consists of 20 folio pages, or 120 columns of type, contains something like half as much reading as the Bible; and even some of our provincial papers contain sometimes in one issue as much matter as would fill an octavo volume of 400 pages. The greater part of this is of necessity passed over by the individual reader as not concerning him: but the various portions appeal strongly to different classes of people. The columns of advertisements, usually arranged according to subject, attract the attention of those who are looking out for what they need. News of the money markets is sought by financiers, of shipping and trade markets by merchants, and of political events and foreign affairs by public men and thoughtful citizens. For the general reader the summary of news, the leading articles, and the reported speeches of eminent men are perhaps the most attractive and useful parts of the newspaper. The records of crime and sporting intelligence have, alas, too great an attraction for multitudes of men.

Though the newspaper has become so much larger, and its contents more multifarious than when Cowper wrote, his description of the weekly newspaper is still appropriate, and the passage with which he closes it still forms a fitting reflection:—

> ''Tis pleasant through the loop-holes of retreat
> To peep at such a world; to see the stir
> Of the great Babel, and not feel the crowd;
> To hear the roar she sends through all her gates
> At a safe distance, where the dying sound
> Falls a soft murmur on the uninjured ear.'

The main purpose of the newspaper is of course to give information, and this purpose is amply accomplished. In the letters of foreign correspondents we have some of the most real knowledge of geography it is possible to attain without the expense and inconvenience of personal travel. In its leading articles we have often the widest survey of current history, and the most minute analysis of our social system, its constant elements, its changing forms, and its passing incidents. In the reports of public speeches we may read the weightiest words of our great statesmen, men of letters, scientific *savants* and divines. Containing such material as this, the newspaper does more than give information—it is a great agent in the formation and guidance of public opinion. In this object its success is perhaps in many respects more qualified from the diverse points of view which different newspapers place before their readers, and especially from the unfortunate fact that so many journals seem to be so thoroughly and inextricably bound up with political partisanship.

Something should be said of the means by which the enormous number of newspapers is produced and distributed. It would be difficult without much inquiry to show how large is the number of persons concerned in this work. The preparation of matter or 'copy' for the paper employs many men of the keenest intellect who work as reporters, correspondents, leader writers, and editors. Many eminent authors have had a considerable part of their training for the highest literary work as reporters and writers for the press; and many interesting and valuable books have been made by collecting series of articles, letters, or essays from the public newspapers. Dr. Russell's Diary of the Crimean War, Mr. Forbes's Correspondence on the Franco-German War and Mr. Sale's Narratives of Travel may be mentioned, though there are many others equally meritorious.

A noteworthy circumstance about much of the newspaper writing is that it is written under such circumstances as makes great speed essential. When important debates are going on in the House of Commons, it often happens that a conclusion has not been arrived at till three o'clock in the morning or later, and by six not only are the important speeches printed and the result announced, but a leading article, founded on the debate and its conclusion, is written and sent forth at the same time.

The same characteristic of expedition must obviously belong to the mechanical work of producing a newspaper, for hundreds of thousands of copies have to be issued a very short time after 'going to press.' Such results can only be achieved by wonderful organisation and the careful employment of all the resources of mechanism and industry.

In the case of some newspapers, as those published once a week, this haste is of course unnecessary. But all the daily morning and evening papers must be produced at high pressure; and of these there are as many as twelve in London, and one or more in every large town in the kingdom. To show the great variety of newspapers we need do no more than mention, that, apart from the daily and weekly papers of a general character, there is scarcely a trade or calling which has not one or more journals devoted to its interests, and that many papers are also issued which appeal particularly to the literary, scientific and religious sections of the community.

A great deal might be said about the influence of the press on society. Suffice it now to say that doubtless for the most part it has been good; for it tends to the spread of knowledge, and so to the development of sound opinions. The greatness of its social influence scarcely needs attestation, but this is afforded by the proverbial name of the newspaper press as the Fourth Estate of the Realm.

The influence of newspapers on the individual character of readers is not so easily dealt with. Mr Cobden is credited with the opinion that a single copy of the 'Times' was worth the whole of Thucydides' Histories as an educational instrument. If in the comparison we regard only the amount of information contained and implied, and the long study necessary to comprehend the vast variety of topics included, there might be found some slight but hardly sufficient ground whereon to rest such an opinion. It is true that there is scarcely a branch of human knowledge on which the daily newspaper would not give us aid, if it were thoroughly studied. But the information it contains is so great and so various, and at the same time so scattered and so fragmentary that it is almost useless for promoting the systematic acquirement of knowledge. Much of the writing in a newspaper is wonderfully good, but haste must have a detrimental effect on a large part. The inflated style of the penny-a-liner is quite proverbial, and although too much abuse may have been heaped on the heads of the reporters it cannot be denied that there is in the columns of the newspaper a decided leaning towards the use of long and high-sounding words, and stiffly-framed sentences, often with little meaning; and that altogether the language lacks that strength which it can only gain by being terse and simple.

From these considerations we may conclude that the constant and exclusive reading of the daily newspaper is likely to lead by its frequent examples to familiarity with, and unconsious imitation of, the faults of stilted language and slipshod style; it will encourage aptness of thought and readiness of speech, but will also help to form desultory habits of mental action; and it will load the mind with a mass of miscellaneous knowledge which may be cyclopædic, but will surely be chaotic.

There are moral effects also to be regarded. It may be feared that knowingness and indifferentism, a craving for sensation and party bitterness are all to some extent encouraged by much that we read in newspapers. In view of this it is desirable that we should read our newspapers with moderation and discrimination. Let us resolutely shun those parts that have no real and essential bearing, but which may have a very mischievous effect, on our lives—the gossip, the scandal, the sensations, the party squabbles, the betting lists. Let us turn rather to the descriptive letters from abroad which abound in useful facts, and to the speeches of great men on lofty themes. Especially let us limit the time which we devote to newspaper reading, and refuse to let the newspaper become the master of our time and thoughts. So may its influence on our own character and indirectly on that of others be for good and not evil.

(To be continued.)

—o—

Tests in Mental Arithmetic.

Standard I.

1. What is the sum of 7 times 4 and 2? 30.
2. How much would 30 oranges cost at 3 a penny? 10d.
3. What would they cost at 4 a penny? 7½d.
4. What change would you get out of a florin? 1s. 4½d.
5. How many pounds of sugar at 4d. a lb. could you get for a florin? 6.
6. How many florins make a sovereign? 10.

7. A farmer had 30 sheep. He sold a dozen; how many had he left? 18.

8. How many months are there in 3 years? 36.

9. How many days are there in 3 weeks? 21.

10. If a boy get a penny a day, how much will he receive in 3 weeks? 1s. 9d.

18. How many halfpennies could he get for this amount? 42.

12. How much more does he want to make half-a-crown? 9d.

STANDARD II.

1. Multiply 6 by itself and halve it. 18.

2. What would 18lbs. of sugar cost at 3d. a lb.? 4s. 6d.

3. If I gave two half-crowns what change should I receive? 6d.

4. If 12 marbles cost 3d., how many can I get for a shilling? 48.

5. How many can I get for half-a-crown? 120.

6. To how many boys could I give 8 each? 15.

7. How many times can 9 be taken from 450? 50.

8. What would 50 balls cost at 2d. each? 8s. 4d.

9. What change would be received out of half-a-sovereign? 1s. 8d.

10. How many 1½d. books can you get for a florin? 16.

11. How many farthings are there in a florin? 96.

12. How many lbs. are there in 2 stone? 28.

STANDARD III.

1. How many pence are there in 76 farthings? 19.

2. How many shillings are there in 90 farthings? 1s. 10½d.

3. What would 8 lbs. of beef cost at 8d. a lb.? 5s. 4d.

4. What is the half of 5s. 4d.? 2s. 8d.

5. How many lbs. are there in ½ cwt.? 56.

6. What would 56 articles cost at a halfpenny each? 2s. 4d.

7. What is the quarter of 2s. 4d.? 7d.

8. What is 7 times ¾? 5¼.

9. How many half-crown books can you get for £5? 40.

10. How many shillings are there in £8½? 170.

11. How many threepenny pieces can you get for 9s.? 36.

12. How many gallons are there in 36 pints? 4½.

STANDARD IV.

1. How many halfpence are there in 7s.? 168.

2. How many more are required to make a quarter of a thousand? 82.

3. If a sheep cost £2 15s., what would four cost? £11.

4. If five sheep cost £11, what would one cost? £2 4s.

5. What would 15 slates cost at 2½d. each? 3s. 1½d.

6. What change would you get out of a crown? 1s. 10½d.

7. How many tops at 1½d. each could you get for that amount? 15.

8. Reduce £1 3s. 9d. to pence. 285.

9. What would 285 articles cost at 4s. each. £57.

10. ⅛ of 72 − ⅕ of 35. 2.

11. A peck of flour cost 1s. 9d.; what is the price per bushel? 7s.

12. What would it cost per quarter. £2 16s.

STANDARD V.

1. What is the cost of 3 acres at £1 15s. per rood? £21.

2. If one article cost half-a-crown, what would 792 cost? £99.

3. ¼ of £1 + ⅓ of a guinea + ⅕ of a crown. 13s.

4. If 3 articles cost 13s., what would 7 cost? £1 10s. 4d.

5. If 6 men can mow a field in 27 days, how many men could mow it in 9 days? 18.

6. Take ½ from the sum of ⅓ and ¼. $\frac{1}{12}$.

7. If I can go $\frac{1}{12}$ of a journey in 3 days, how long would it take to go the remainder? 33 days.

8. If $\frac{1}{12}$ of a post is in the ground, and 7 yds. 1 ft. above ground, what is the length of the post? 8 yards.

9. What part of 8 yards is 1 yd. 1 ft.? $\frac{1}{6}$.

10. What is the interest on £400 for 3½ years at 3½ per cent.? £49.

11. Find the amount of £150 for 6 years at 4½ per cent. £190 10s.

12. If a profit of 10 per cent. be charged on an article costing 7s. 6d., what is the selling price? 8s. 3d.

STANDARDS VI. AND VII.

1. What fraction of a florin is $\frac{1}{12}$ of a sovereign? $\frac{5}{6}$.

2. Express it as a decimal. $\cdot 8\dot{3}$.

3. Multiply ·45 by ·08. ·036.

4. Divide ·45 by ·08. 5·625.

5. What fraction of a stone is ¼ lb.? $\frac{1}{56}$.

6. I own ¼ of a ship. If I sell ⅕ of my share for £500, what is the value of the ship? £10,000.

7. What is the value of $\frac{7}{12}$ of the ship? £5,833 6s. 8d.

8. What is the interest on £75 for 3 years at 3 per cent.? £6 15s.

9. If goods costing £75 be sold for £100, what is the gain per cent.? 33⅓.

10. I bought a horse for £40, and sold it for £34; what did I lose per cent.? 15.

11. What ought I to have sold it for to gain 6¼ per cent? £42 10s.

12. What sum of money will gain £14 in a year at 4 per cent.? £350.

* * *

Quarterly Arithmetical Tests.

Standard I.—First Quarter.

1.	147	2.	736		
	60		204	4.	2 × 6;
	315				7 × 3;
	9	3.	859		4 × 5.
	82		312		

Second Quarter.

1.	6	2.	527		
	54		493	4.	12 × 3;
	738				6 × 7;
	90	3.	215		8 × 4.
	5		8		

Third Quarter.

1.	79	2.	670		
	503		192	4.	4 × 4;
	84				8 × 6;
	962	3.	413		5 × 11.
	41		39		

Standard II.—First Quarter.

1. 58 + 7,603 + 9 + 98,047 + 316 + 4,520.
2. 69,427 × 38.
3. Take 78,609 from 85,014.
4. 29d.; 34d.; 59d.

Second Quarter.

1. Divide 35,345 by 5. Write the answer in words.
2. 47,058 × 691.
3. John had sixty-nine marbles. He lost 18, sold forty, and bought two dozen. How many has he?
4. 75d.; 86d.; 107d.

Third Quarter.

1. Multiply 38, 796 by 7,050.
2. 71,903 ÷ 8.
3. From the product of 406 and 604 take 460.
4. 92d.; 118d.; 139d.

Standard III.—First Quarter.

1. Divide 60,628 by 92.
2. A boy had a bag of marbles. He gave 14 boys 9 each, and had 78 left. How many had he at first?
3. Divide one hundred thousand and twenty by one hundred and thirty-seven.
4. What number multiplied by 78 will give the same product as 1,170 multiplied by 49?

Second Quarter.

1. Find the difference between £6,075 18s. 5¼d. and £10, 704 13s. 11¾d.
2. A luggage train travels 342 miles in 19 hours, and a passenger train 595 miles in 17 hours. How many miles an hour does one train travel more than the other?
3. £78 16s. 7¾d. + £5 12s. 4½d. + £301 19s. 8d. + 15s 9¾d. + £84 10s 11¼d. + £6 8s. 5¾d.
4. A gentleman had £2,000. He bought a house for £765 10s., and land for £219 12s. 6d. How much had he left?

Third Quarter.

1. Add fifty thousand one hundred and eighty-six pounds thirteen shillings and sevenpence halfpenny, eight thousand nine hundred and fifty-two pounds seventeen shillings and eleven pence farthing, nine hundred and seven pounds fourteen shillings and eight pence three farthings, seven thousand three hundred and nineteen pounds sixteen shillings and ten pence, and thirty-eight thousand and sixty-five pounds eleven shillings and nine pence three farthings.
2. The population of a town is 35,880, of which one sixth are children. How many schools could be filled reckoning 460 children for each school?
3. Take nineteen thousand seven hundred and thirty pounds nineteen shillings and eight pence three farthings from thirty thousand and six pounds eight shillings and seven pence halfpenny.
4. A baker made 420 buns. He sold 258 at a penny each, and the remainder at two a penny. How much did he get for all?

Standard IV.—First Quarter.

1. £75 16s. 11¼d. × 34.
2. A man saves 3s. 10d. a week. How much could he save in three years, reckoning 52 weeks in a year?
3. Divide twenty thousand pounds by 476.
4. Add together 365 shillings, 365 sixpences and 365 pence.

Second Quarter.

1. Reduce 76 sq. yds. 5 ft. 129 inches to square inches.
2. A pig weighs 13 stone 10 lbs. Find the value of it at 5½d. per lb.
3. How many minutes are there in a leap year?
4. A tub of butter was sold for £8 10s. If butter was 1s. 3d. per lb., how much did the tub contain?

Third Quarter.

1. A milkman sells 19½ gallons daily. How many pints does he sell in a fortnight?
2. How many ounces added to 809 oz. will make 1½ tons?
3. What would a catch of seventy thousand herrings be worth at 5 for 3d.?
4. How many hurdles, each 4 ft. 9 in. long, could be made out of a fence 6 miles 5 fur. 8 po. in length?

STANDARD V.—FIRST QUARTER.

1. Find the value of 702 articles at 17s. $8\frac{3}{4}$d. each.

2. What is the cost of 19 qrs. 2 bus. 3 pks. at £5 10s. per quarter?

3. How much is required to pay 2,873 men £3 14s. 10d. each?

4. How much coal will an engine consume in 47 days, if it use 17 cwt. 15 lbs. daily?

SECOND QUARTER.

1. A girl saves 6s. 5d. in seven weeks. How long will it take her to save £5 10s.?

2. Bill:—

150 eggs at 8d. per dozen;
$13\frac{1}{2}$ lbs. at $4\frac{1}{2}$d. per lb.;
17 lbs. at $6\frac{1}{2}$d. per lb.;
$\frac{1}{4}$ cwt. at $8\frac{3}{4}$d. per lb.;
65 lbs. at 23s. 4d. per cwt.

3. What is the value of 59 reams 12 quires 17 sheets of paper at 30s. per ream?

4. How many lbs. of butter at 1s. 4d. per lb. are worth 1 cwt. 2 qrs. 24 lbs. of cheese at $9\frac{1}{2}$d per lb.?

THIRD QUARTER.

1. How much less is $\frac{4}{9}$ than $\frac{7}{8}$?

2. Find the sum of $\frac{2}{3}$, $\frac{2}{5}$, $\frac{2}{7}$, and $\frac{3}{9}$.

3. Make out a bill for:—

30 knives at 16s. per dozen;
2 dozen spoons at 1s. 9d. each;
2 sets of dish covers at 3 guineas per set;
19 stair rods at £1 7s. 6d. per dozen;
75 carpet nails at 3s. 6d. per hundred.

4. Take $\frac{1}{2} + \frac{5}{8}$ from $\frac{5}{9} + \frac{2}{3}$.

STANDARD VI.—FIRST QUARTER.

1. What must be added to $4\frac{15}{16}$ to make $9\frac{13}{18}$?

2. Simplify:—$(7\frac{1}{2}-\frac{5}{6}) \div (6-3\frac{4}{9})$.

3. Divide ·388206 by 4·875, and subtract ·078592 from the quotient.

4. Reduce $\cdot\dot{7}8\dot{3}$ and $\cdot 91\dot{6}$ to vulgar fractions in their lowest terms.

SECOND QUARTER.

1. Find the value of x in this proportion:—

$$3\tfrac{1}{3} : x :: 4\tfrac{1}{4} : 5\tfrac{1}{3}.$$

2. If £1 17s. 6d. be paid for mowing $7\frac{1}{2}$ acres, what should be paid for mowing 29 ac. 3 ro. 15 po.?

3. Find the value of ·0068 of a ton, and add to it ·768 of a lb.

4. If £7 16s. 8d. be divided between a man and a woman, and the woman gets half as much again as the man, what is the man's share?

THIRD QUARTER.

1. What is the amount of £736 15s. for $5\frac{1}{2}$ years at $3\frac{1}{2}$ per cent.?

2. From a cistern $\frac{7}{8}$ full 40 gallons are drawn; 30 gallons are then added, and it is found to be $\frac{2}{3}$ full. How much does the cistern hold?

3. In what time will £520 gain £93 12s. at 6 per cent.?

4. After paying an income tax of 7d. in the pound, a gentleman has £815 10s. left. Find his income.

STANDARD VII.—FIRST QUARTER.

1. What is the insurance on £5,790 at $\frac{5}{8}$ per cent.?

2. 16 horses can be kept 15 days for £24; how long will 20 horses be kept for £37?

3. What sum will amount to £803 17s. 6d. in $2\frac{1}{2}$ years at $4\frac{1}{4}$ per cent.?

4. If £60 gain £3 5s. in 7 months, how much will £245 gain in 9 months?

SECOND QUARTER.

1. A, B, and C are three pipes connected with a cistern. A can fill it in 50 minutes, B can fill it in an hour, whilst C can empty it in 40 minutes. If all be opened together, in what time will the cistern be full?

2. If I mix $7\frac{1}{2}$ lbs. of tea at 3s. 6d. per lb., 5 lbs. at 2s. 9d. per lb., $3\frac{1}{4}$ lbs at 2s. 4d. per lb., and 2 lbs. at 1s. 11d. per lb., what is the value per lb. of the mixture?

3. At what rate per cent. must £390 be invested, so that in 5 months it will amount to £397 6s. 3d.?

4. What is the average yearly rent of 8 houses, two of which are let at £25 a year, one at 30 guineas a year, three at 7s. 6d. per week, and two at 6s. 3d. per week?

THIRD QUARTER.

1. A flock of eighty thousand sheep increases annually at the rate of 5 per cent. What will be the number at the end of 3 years?

2. If by selling an article for £35 3s. 4d. I gained $5\frac{1}{2}$ per cent., what would it have been sold for if I had lost $5\frac{1}{2}$ per cent.?

3. If the wages of a man is twice that of a boy, and 7 men and 5 boys earn £23 15s. in 10 days, find a man's wages per day.

4. A farmer's rent is £180, and his landlord accepts £168 15s. What percentage does the landlord remit?

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	613.	893.	1,669.
2.	532.	34.	478.
3.	547.	207.	374.
4.	12; 21; 20.	36; 42; 32.	16; 48; 55.

STANDARD II.

	FIRST.	SECOND.
1.	110,553.	7,069.
2.	2,638,226	32,517,078.
3.	6,405.	35 marbles.
4.	2s. 5d.; 2s. 10d.; 4s. 11d.	6s. 3d.; 7s. 2d.; 8s. 11d.

THIRD.

1.	273,511,800.	3.	244,764.
2.	8,987+7.	4.	7s. 8d.; 9s. 10d.; 11s. 7d.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	659.	£4,628 15s. $6\frac{1}{2}$d.	£105,432 14s. $11\frac{1}{4}$d.
2.	204 marbles.	17 miles.	13 schools.
3.	730 + 10.	£478 3s. 11d.	£10,275 8s. $10\frac{3}{4}$d.
4.	735.	£1,014 17s. 6d.	£1 8s. 3d.

STANDARD IV.

	FIRST.	SECOND.
1.	£2,578 15s. $10\frac{1}{2}$d.	99,345 sq. in.
2.	£29 18s.	£4 8s.
3.	£42 0s. 4d. + 16d.	527,040 min.
4.	£28 17s. 11d.	1 cwt. 24 lbs.

THIRD.

1.	2,184 pints.	3.	£175.
2.	52,951 oz.	4.	7,392 hurdles.

STANDARD V.—FIRST.

1. £622 5s. 10$\frac{1}{2}$d.
2. £106 7s. 9$\frac{3}{4}$d.
3. £10,749 16s. 2d.
4. 40 tons 5 cwt. 1 qr. 5 lbs.

SECOND.

1. 2 years 16 weeks.
2. 8s. 4d. + 5s. 0$\frac{3}{4}$d. + 9s. 2$\frac{1}{2}$d. + £1 0s. 5d. + 13s. 6$\frac{1}{2}$d. = £2 16s. 6$\frac{3}{4}$d.
3. £89 9s. 0$\frac{3}{4}$d.
4. 114 lbs.

THIRD.

1. $\frac{31}{72}$.
2. 1 $\frac{121}{318}$.
3. £2 + £2 2s. + £6 6s. + £2 3s. 6$\frac{1}{2}$d. + 2s. 7$\frac{1}{2}$d. = £12 14s 2d.
4. $\frac{7}{72}$.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	4$\frac{113}{144}$.	4$\frac{4}{51}$.	£878 11s. 5$\frac{17}{20}$d.
2.	2$\frac{14}{23}$.	£7 9s. 2$\frac{5}{8}$d.	48 gallons.
3.	·00104	16 lbs.	3 years.
4.	$\frac{29}{37}$; $\frac{11}{12}$.	£3 2s. 8d.	£840.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	£36 3s. 9d.	1hr. 25$\frac{5}{7}$ min.	92,610 sheep.
2.	18$\frac{1}{2}$ days.	2s. 10$\frac{54}{71}$d.	£31 10s.
3.	£726 13s. 4d.	4$\frac{1}{2}$ per cent.	5s.
4.	£17 1s. 3d.	£21 11s. 3d.	6$\frac{1}{4}$ per cent.

—o—

Jeanne d'Arc, by Lamartine.

JEANNE D'ARC.	JOAN OF ARC.
On eût dit	One would have said
que c'était le dernier assaut	that it was the last attack
qu'elle donnait elle-même à sa fortune.	that she herself made against her good fortune.
Le duc d'Alençon,	The Duke of Alençon,
tremblant de perdre en elle	afraid of losing in her
l'âme et la foi d'armée,	the life and faith of the army,
fut forcé d'accourir lui-même	was forced to run himself
et de l'enlever dans les bras	and to carry her off in the arms
de ses soldats du champ de carnage	of his soldiers from the field of slaughter,
où elle voulait mourir.	where she wished to die.
La nuit couvrait les murs et la plaine.	Darkness shrouded the walls and the plain.
Les généraux du roi firent silencieusement retirer les troupes.	The king's generals caused the troops to retreat silently.
Pour dérober leurs pertes	In order to conceal their losses
aux regards des Parisiens	from the eyes of the Parisians,
quand le jour viendrait,	when day broke,
ils relevèrent les morts	they picked up the dead
des bords du fossé,	on the edge of the ditch,
ils les entassèrent,	they piled them up,
comme dans un bûcher,	as in a wood-house,
dans la grange de la ferme des Mathurins,	in the granary of the farm of Les Mathurins,
et les brûlèrent pendant les ténèbres	and burnt them during the darkness,
pour ne laisser que de la cendre aux Anglais.	so as to leave only ashes to the English.
Ce revers, confondant avec tant d'éclat	This reverse (defeat), confounding so strikingly
les prophéties de Jeanne d'Arc,	the prophecies of Joan of Arc,
fut le premier démenti du ciel	was the first contradiction of Heaven
à son esprit divinatoire et	to her prophetic spirit and
la première atteinte au prestige populaire	the first blow to the popular prestige
de son infaillibilité.	of her infallibility.
Elle commença elle-même	She herself began
à douter d'elle-même.	to have doubts about herself.
Son esprit chancela	Her mind staggered
avec sa fortune.	under her bad fortune.
Elle s'humilia devant Dieu	She humbled herself before God
et devant le roi,	and before the king,
et, renonçant à la guerre,	and giving up fighting,
elle suspendit son armure blanche	she hung up her white armour
et son épée sur le tombeau	and her sword on the tomb
de saint Denis, dans la basilique.	of St. Denis, in the Basilica.
Mais le roi et les chevaliers	But the king and his knights
la supplièrent tellement de les reprendre	besought her so earnestly to resume them
et s'accusèrent tellement eux-mêmes	and accused themselves so bitterly
des fautes qui avaient déconcerté ses prophéties,	of the faults which had disconcerted her prophecies,
qu'elle eut la faiblesse de les revêtir	that she was weak enough to resume them
encore par complaisance pour l'armée,	once more out of complacency for the army,
et de continuer à inspirer et à combattre,	and to continue to inspire and fight,
quand le souffle n'inspirait plus	when the breath of inspiration no longer inspired
et quand l'esprit ne combattait plus en elle.	and when her spirit no longer moved her.

XXXVI.

Ce marchandage de Jeanne par ses ennemis,	This bartering (sale) of Joan by her enemies,
dont les plus acharnés	of whom the most relentless
étaient des compatriotes,	were her fellow countrymen,
avait duré six mois.	had lasted six months.
Elle avait été arrachée	She had been torn
avec douleur aux soins et aux amitiés	with bitter grief from the loving care and affections
des femmes de la maison	of the ladies of the house
de Luxembourg à Beaurevoir,	of Luxemburg at Beaurevoir,
transportée à Arras, puis à Rouen	carried to Arras, then to Rouen
où elle arriva enchaînée.	where she arrived in chains.
Pendant ces six mois,	During these six months,
l'influence de cet ange de la guerre	the influence of this angel of war
sur les troupes de Charles VII.,	over the troops of Charles VII.,
son âme qui survivait dans les conseils	her spirit which survived in the councils
et dans les camps de ce prince,	and in the camps of this prince,
la superstition patriotique	the patriotic superstition
du bas peuple pour elle,	of the lower orders for her,
superstition que sa captivité	a superstition which her captivity
n'avait fait que redoubler,	had only increased,
l'absence enfin du duc de Bourgogne,	finally, the absence of the Duke of Burgundy,
lassé de la guerre, enclin à négocier,	weary of war and inclined to negotiate,
rassasié de puissance,	satiated with power,
ivre d'amour et de fêtes,	intoxicated with love and feasting,
oisif dans ses États de Flandre,	leading an idle life in Flanders,
toutes ces causes avaient entraîné	all these causes had brought
revers sur revers pour les Anglais,	disaster after disaster on the English,
succès sur succès pour Charles VII.	victory after victory to Charles VII.

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XXXVIII.

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L'évêque parla à l'accusée avec mansuétude,	The bishop spoke to the accused with gentleness,
comme pour attester une impartialité	as if to prove his impartiality
ou une pitié qui donneraient ensuite	and pity, which would afterwards give
plus d'autorité à l'arrêt.	more authority to the sentence.
Elle se plaignit d'abord doucement	At first she gently complained
du poids et de la pression des anneaux de fer	of the weight and pressure of the iron rings
qui blessaient ses membres.	which wounded her limbs.
L'évêque lui dit que ces fers	The bishop told her that these fetters
étaient une précaution qu'on avait été	were a precaution which they had been
contraint de prendre pour prévenir	compelled to adopt in order to prevent
ses tentatives réitérées d'évasion.	her repeated attempts to escape.
La prisonnière avoua	The prisoner confessed
qu'au commencement de sa captivité	that at the beginning of her imprisonment
elle avait naturellement désiré de s'enfuir,	she had naturally wished to escape,
mais qu'il n'y avait en cela	but that there was in that (fact)
ni déloyauté ni crime à elle,	neither disloyalty nor crime,
puisqu'elle n'avait jamais donné	since she had never given
à personne sa foi de ne pas sortir du château.	to anyone her word not to go out of the castle.
Le procès ne dit pas	The records do not say
si on allégea ses fers.	whether they took off her irons.
Après cet épisode,	After this episode (interruption),
on lui lut son acte d'accusation,	they read the charges against her,
moins politique que religieux,	less political than religious,
dans lequel elle était chargée	in which she was accused
de crimes contre la foi,	of crimes against the faith,
d'hérésies et de sortilèges.	of heresy and sorcery.

* * * * * * *

Elle avoua, dans les séances suivantes,	She confessed, in the succeeding sittings,
que son père avait eu	that her father had had
un songe pendant qu'elle était enfant,	a dream whilst she was a child,
dans lequel songe il avait vu	in which dream he had seen
avec terreur sa fille Jeanne	with horror his daughter Joan
guerroyant avec les gens d'armes.	fighting with men at arms.
Requise de parler de ses révélations,	Being requested to speak of his revelations,
elle trancha d'un mot les pièges	she baffled with one word their snares,
et répondit que tout ce qu'elle avait fait de bien,	and replied that what good she had done,
elle l'avait fait par ses propres inspirations.	she had done it by her own inspiration.
On lui demanda	They asked her
s'il n'y avait aucun signe magique	if there was no magical sign
sur un anneau qu'elle portait au doigt,	on a ring which she wore on her finger,
et pourquoi elle regardait cet anneau	and why she looked at this ring
avec piété au moment des batailles.	so piously in the hour of battle.
'C'est, dit-elle,	'Because,' said she,
qu'il y avait gravé	'there was engraven
sur le laiton le nom de Jésus,	on the ring the name of Jesus,
et parce qu'aussi cet anneau	and because this ring
lui rappelant avec *plaisance*	recalling with feelings of joy
son père et sa mère,	her father and mother,
elle aimait à le sentir en sa main	she liked to feel it in her hand
et à son doigt.'	and on her finger.'

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On arracha Jeanne,	They dragged Joan,
toute malade et affaiblie de corps,	(although) quite ill and weak in body,
aux ténèbres de son pilier où	from the darkness of her pillar where
elle languissait depuis quatre mois,	she had languished for four months,
pour la torturer en public dans son âme.	to torture her soul in public.
On avait dressé deux échafauds	They had erected two scaffolds
dans le cimetière de Saint-Ouen,	in the cemetery of St. Ouen,
derrière la basilique de ce nom.	behind the church of that name.
Le cardinal de Winchester,	The cardinal of Winchester,
représentant le pouvoir royal	representing the Royal power
des Anglais en France ;	of the English in France ;
Cauchon, représentant la servilité ambitieuse	Cauchon, representing ambitious servility
vendant son pays pour des honneurs ;	selling his country for honours ;
les juges, le clergé, les docteurs,	the judges, the clergy, the divines,
les assesseurs, les prédicateurs de l'Université,	the assessors, the preachers of the University,
représentant la légalité au service de la force,	representing legality in the service of power (force),
étaient assis sur un de ces échafauds.	were seated on one of these scaffolds.
Jeanne, les chaînes aux pieds et aux mains,	Joan, with chains on her hands and feet,
attachée à un poteau	fastened to a stake
par une ceinture de fer,	by an iron ring round her waist,
entourée de tabellions	surrounded by registrars
prêts à enregistrer	ready to take down
ses paroles et de ministres de la torture,	her words, and by minions of torture,
armés de leurs instruments de douleur,	armed with their instruments of torture,
prêts à lui arracher les faiblesses	eager to extort from her the weakness
ou les cris de la nature,	or the cries of nature,
le bourreau avec sa charrette sous ses yeux,	the executioner with his cart before her eyes,
prêt à emporter son cadavre mutilé,	ready to carry away her mangled corpse,
étaient en face sur l'autre échafaud.	were on the opposite scaffold.
Un peuple immense, superstitieux,	The people in vast crowds, superstitious,
frappé de cet appareil,	awed by these preparations,
partagé entre le respect	divided between respect
pour les autorités civiles et religieuses,	for the civil and religious authorities,
la crainte de l'étranger,	the dread of foreign rule,
l'horreur de cette prétendue magicienne	horror for this supposed sorceress
et la pitié pour cette jeune fille	and pity for this young girl
dont la beauté éclatait	whose beauty shone forth
plus touchante sous l'ombre de la mort,	more touchingly under the shadow of death,
frémissait sur la place et sur les toits.	shuddered in the market-place and on the roofs.

Un prédicateur célèbre du temps,	A celebrated preacher of that time,
Guillaume Erard, apostrophait Jeanne	William Erard, apostrophised Joan
et s'efforçait de la ramener	and attempted to bring her
à un désaveu de ses erreurs	to a disavowal of her errors (sins)
et à la soumission complète	and to complete submission
à ce que l'Église déciderait	to what the church should decide
des droits des deux compétiteurs.	as to the rights of the two competitors (to the throne of France).

* * * * * * *

On lui rendit	They gave her back
les habillements de femme	her woman's dress
pour le supplice.	during the execution.
On l'y conduisit sur une charrette,	She was taken there on a car,
entre son confesseur et un huissier.	between her confessor and an usher.
Un moine charitable la suivit à pied,	A charitable monk followed her on foot,
priant pour son âme	praying for her soul,
et représentant la dernière pitié	as the representative of the most profound pity
au pied de l'échafaud.	at the foot of the scaffold.
Il se nommait Isambart :	His name was Isambart:
l'histoire doit son nom à tous ceux	history is bound to preserve his name for all those
qui savent aimer jusqu'à la mort.	who can love even unto death.
Le fourbe Loiseleur,	The traitor Loiseleur,
employé par l'évêque	employed by the bishop
pour arracher à Jeanne ses secrets	to extort from Joan her secrets
sous le semblant de la confession,	under the cloak of confession,
monta avant le départ	mounted before her departure
sur la charrette pour obtenir de sa victime	on the car to wring from his victim
le pardon de sa trahison.	a pardon for his treason.
Les Anglais eux-mêmes s'ameutèrent	The English themselves rose in a mob
à la vue de ce traître	at the sight of this traitor
et le couvrirent de huées et de menaces :	and overwhelmed him with howls and threats :
versatilité naturelle aux foules,	a fickleness natural to mobs,
qui veulent bien frapper,	whose wish is to strike hard,
mais non trahir !	but not to betray !
'O Rouen, Rouen !	'Oh ! Rouen, Rouen !
disait-elle en se lamentant,	said she, bewailing her lot,
c'est donc ici que je dois mourir ?'	it is here then that I must (am to) die ?'
Elle s'étonnait que le ciel	She marvelled that Heaven
la laissât mourir si jeune,	should allow her to die so young,
avant qu'elle eût fini son œuvre	before she had accomplished her task,
et que la France tout entière fût purgée	and before all France was cleared (purged)
par elle de ses oppresseurs ;	by her of its oppressors ;
elle attendait incertaine un miracle	she expected in uncertainty either a miracle
ou la mort jusqu'au pied du bûcher.	or death even at the (foot of the) stake.

XL.

Telle fut la vie de Jeanne d'Arc,	Such was the life of Joan of Arc,
l'inspirée, l'héroïne et la sainte	the inspired prophetess, heroine and saint
du patriotisme français :	of French patriotism :
gloire, salut et honte de la nation tout à la fois.	at once the glory, salvation and shame of France.
Le peuple, pour l'encadrer	The nation, in order to rank her
parmi les plus sublimes et les plus touchantes figures	among the sublimest and most striking characters
de l'histoire, n'a pas besoin	of history, has no need
d'accepter les imaginations enthousiastes	to accept the enthusiastic imaginations
de la multitude ni les explications d'un autre temps.	of the multitude nor the explanation of other ages.
La patrie opprimée souffle	Her poor oppressed country
son âme sur une jeune fille ;	breathed its very soul into the young girl ;
sa passion pour la liberté de son pays	her passion for the freedom of her country
lui fait le don des miracles,	dowers her with the gift of miracles,
don que la nature fait	a gift which nature confers
à toutes les grandes passions désintéressées.	on all great unselfish passions.
S'élançant des rangs du peuple,	Rushing from the ranks of the people,
retenue par ses proches,	kept back by her relations,
entraînée par le dévouement,	carried away by her devotion,
accueillie par la politique,	received by politicians (lit. policy),
déployée comme un drapeau par les chefs	made use of (lit. unfurled) like a standard by the chiefs
et par les combattants d'une cause perdue,	and combatants of a lost cause,
déifiée par le vulgaire,	deified by the common people,
victorieuse des ennemis,	victorious over her enemies,
abandonnée du roi,	abandoned by her king,
des hommes et de son génie	by men and by her own genius,
après son œuvre achevée,	after her mission was accomplished,
odieuse aux usurpateurs,	an object of hatred to usurpers,
vendue par l'ambition,	sold by ambition,
jugée des lâches, condamnée par ses frères,	tried by cowards, condemned by her fellow countrymen,
sacrifiée en holocauste aux étrangers,	sacrificed like a holocaust for foreigners,
elle s'évanouit, comme un météore,	she vanished, like a meteor,
dans un sacrifice qui paraît	in a sacrifice which seemed
aux uns une expiation,	to some an expiation (of her crimes),
aux autres une assomption dans la mort.	to others her ascension into Heaven through her death.
Tout semble miracle dans cette vie,	Everything in her life is miraculous,
et cependant le miracle,	and yet this miracle,
ce n'est ni sa voix, ni sa vision,	is not her voice, her visions,
ni son signe, ni son étendard,	her signs, her standard,
ni son épée, c'est elle-même.	nor her sword, but the miracle is herself.
La force de son sentiment national	The strength of her national feelings
est sa plus sûre révélation.	is that which most surely reveals herself to us.
Son triomphe atteste l'énergie	Her triumph bears witness to the energy
de cette vertu en elle.	of that virtue (= national feelings) in her.
Sa mission n'est que l'explosion	Her mission was only the outburst
de cette foi patriotique dans sa vie ;	of that patriotic faith in her life ;
elle en vit et elle en meurt,	through it (*en*) she lives, by it (*en*) she dies,
et elle s'élève à la victoire	and rises to victory
et au ciel sur la double flamme	and Heaven on the double flames

de son enthousiasme et de son bûcher.	of her enthusiasm and her funeral pile.
Ange, femme, peuple, vierge,	An angel and a woman, a daughter of the people and a virgin,
soldat, martyre,	a heroine and a martyr,
elle est l'armoirie du drapeau des camps,	she is the honour and glory of the flag of embattled fields,
l'image de la France popularisée	the living image of France embodied
par la beauté, sauvée par l'épée,	in her beauty, saved by her sword,
survivant au martyre, et divinisée	surviving her martyrdom, and made divine
par la sainte superstition de la patrie.	through the holy superstition of the nation.

(*The end.*)

Our Certificate Class.

BY DR. GEORGE BEACH, M.A.

Head Master of Christ Church School, Macclesfield.

HISTORY.

FEMALES.

(*Three hours allowed for this paper.*)

Candidates are permitted to answer EIGHT questions only.

I. What are Privy Councillors, Ministers, and Cabinet Ministers? Give an account of their several functions.

II. Give an account of the origin of the American War of Independence.

III. Describe the growth in numbers of the Peerage during the younger Pitt's tenure of office. What was his policy in this respect?

IV. Take *four* of the following names, and briefly say what makes them noteworthy in English history—Wilberforce, Clive, Paley, 'Junius,' Hogarth, Cowper, Richard Brinsley Sheridan.

V. Write a short life of Washington *or* Burke.

VI. State briefly what you know of the 'Reformation of the Calendar' and the 'South Sea Bubble.'

VII. Compile a short account of Indian affairs from 1750 to 1760.

VIII. Name the authors of any three of the following:—'Tam o' Shanter,' 'Ivanhoe,' 'Decline and Fall of the Roman Empire,' 'Tristram Shandy.' In each selected case name any other work by the same writer.

IX. Describe Wilkes' struggle with the Parliament, its origin, incidents, and results.

X. Describe the battle of the Nile *or* the Gordon Riots.

XI. How did the French Revolution affect English policy?

XII. What do you know of Brindley, Jenner, Arkwright, and Macadam? Select three of the given four.

XIII. What was the issue of the following battles, and in what campaigns and countries were they fought:—Oudenarde, Heights of Abraham, Preston-pans, and Seringapatam?

XIV. Give an account of the 'Armed Neutrality' of 1780.

XV. Briefly sketch any two remarkable voyages of the eighteenth century.

HISTORY.

MALES.

(*Two hours and a half allowed for this paper.*)

Candidates are not permitted to answer more than EIGHT questions, and are *advised* to answer the last.

I. Give some account of three of the following persons:—Becket, Wat Tyler, Lambert Simnel, Cranmer, Titus Oates, and Major André.

II. When, between whom, and with what immediate results were the following battles fought:—Tenchebrai, Lincoln, Bannockburn, Flodden, The Nile, and Seringapatam?

III. Enumerate six of the principal provisions of the Magna Charta.

IV. State with dates what you know of three of the following:—Justices in Eyre, Statute of Mortmain, Poyning's Law, Riot Act, Union of Ireland with England.

V. Who were Elizabeth of York, Mary II. (of Orange), and Sophia of Hanover, and what were their claims to the throne?

VI. What were the principal articles of the treaty of Utrecht?

VII. Deduce our Queen's descent from James I. What European complications have been avoided by a female ascending the throne in 1837?

VIII. What was the fate and the circumstances attending it of General Elphinstone, Lord Raglan, Sir Henry Lawrence, and George William Gordon?

IX. Who were the Chartists and what were their principal demands?

X. What do you know of Cobden, Nana Sahib, Messrs. Slidell and Mason, and John Stuart Mill?

XI. What was Sir Robert Peel's action with regard to 'The Bedchamber question,' the Maynooth Grant, and the Corn Laws?

XII. Answer *either* of the following questions:—
(*a*) How is a Law made in England?
(*b*) What do you know of 'The Cabinet'?

GEOGRAPHY.

MALES.

Two hours and a half allowed for this Paper.

Candidates may only answer THREE of the first FIVE, and only FOUR other questions. Small sketch maps or diagrams may be drawn to illustrate any answers at the candidate's discretion.

I. Describe the system of 'Triangulation' by which a degree on the earth's surface has been measured. Explain why, at the Equator, the days and nights never vary in length.

II. What are the conditions which determine the amount of the 'rainfall'? What is the extent and situation of 'the rainless district'?

III. Explain the origin and general direction of the Trade Winds. Give an account of the Japan Current.

IV. Distinguish between climate and weather. 'The mean annual temperature of England is 2° F. warmer than it was a century ago.'—How has this change been effected?

V. Mention the most marked instances of man's influence upon the distribution of animal life.

VI. What effect has climate exerted upon the descendants of English, Spanish and Dutch colonists?

VII. Describe the course of the Ganges *or* St. Lawrence.

VIII. Describe the physical features of the east coast of Hindostan *or* of Cape Colony.

IX. Where, what and for what noted are—The Downs, Staffa, Lucknow, Superior, Londonderry, St. Helena, Hong Kong, Manaar, Kimberley?

X. Give a short account of New Zealand *or* Jamaica: (*a*) its history; (*b*) its government; (*c*) its prospects; (*d*) its productions.

XI. Show that the principal necessities of modern life can be supplied from within our Empire, without resorting to foreign countries.

XII. Discuss 'Imperial Federation' with respect to—(*a*) government; (*b*) commerce; and (*c*) England as a European Power.

GEOGRAPHY.

FEMALES.

(*Three hours allowed for this Paper.*)

No candidate is permitted to answer more than EIGHT *questions, and the first question should not be omitted by any.*

I. Draw a map of Cape Colony *or* Hindostan *or* Ireland.

II. Enumerate the principal divisions of Australia, giving their principal towns, rivers and exports.

III. Give a short account of New Zealand *or* Jamaica: (*a*) its history; (*b*) its government; (*c*) its prospects.

IV. What do you know about the Canadian Pacific Railway? What dispute exists now concerning it?

V. Describe briefly the principal fisheries of the British Empire.

VI. What are the various religions of our fellow-subjects? Give particulars.

VII. Describe with the aid of a map the course of the Trent *or* the Darling.

IX. Where, what and for what noted are The Downs, Staffa, Lucknow, Superior, Londonderry, St. Helena, Hong Kong, Manaar, Kimberley?

X. Trace very briefly the development of our Colonial Empire.

XI. Who are the Maoris, Mahrattas, Kaffirs, Eurasians and Boers respectively?

XII. Give Notes of a Lesson for a highest class upon 'Our Coaling Stations.'

XIII. What Straits are dominated by our possessions?

POLITICAL ECONOMY.

(*Three hours allowed for this paper.*)

Candidates are not permitted to answer more than EIGHT *questions, and are* ADVISED *to answer the* LAST.

I. What do you know of Mr. Goschen's recent 'Conversion Scheme'?

II. Distinguish, briefly but accurately, between the following economical terms, giving simple illustrations :—Demand and Consumption, Free Trade and Fair Trade, Lock-outs and Strikes, Wealth and Capital.

III. Briefly discuss Bimetallism versus Monometallism. What facts of the last ten years have rendered this question urgent?

IV. Name some of the leading points in which the science of Political Economy has been modified since the 'Wealth of Nations' was published.

V. Discuss the advantages of the Joint Stock system, and explain the frequent failure of enterprises with limited liability.

VI. Show that the rent of land is regulated by the excess of its produce above that which would be produced on the worst land in cultivation with the same expenditure of labour and capital.

VII. Distinguish between Direct and Indirect Taxes. Show from English History the injustice of a Poll Tax, and of taxes on the necessaries of life, as principal sources of revenue.

VIII. What principles should regulate Prison Labour? Are they identical with those which should determine Reformatory Labour, and if not, why not?

IX. 'Trade follows the Flag.' 'Civilisation follows Trade.' Illustrate the truth of these maxims from the history of Hindostan.

X. How does a Bank make its profit? What is meant by a 'run' on a Bank? Give particulars respecting the suspension of specie payment by the Bank of England.

XI. Explain how the rate of wages is affected by our system of Poor Relief. What are the chief evils of 'Outdoor Relief'?

XII. What is meant by Extensive and Intensive Cultivation? Give instances.

XIII. What is the Malthusian theory respecting population? Enumerate the various 'checks' upon population.

XIV. Prepare the outlines of a lesson to an advanced class on—

- (*a*) Price *or*
- (*b*) The nationalisation of the land *or*
- (*c*) Obedience to law.

NEEDLEWORK.

(*Marks will be given for industry and general finish.*)

I. Cut out and tack together the left half front of a boy's shirt, setting on half of collar.

II. Darn a hedge tear on linen or fine calico.

III. On a piece of calico (6 × 6) work three inches of plain stitching, and a buttonhole.

IV. On the same piece of calico place a plain patch.

DICTATION.

N.B.—THE CANDIDATES ARE REQUESTED NOT TO READ THE FOLLOWING EXTRACTS UNTIL THE DICTATION TEST HAS BEEN APPLIED.

MALES.

Extract from Macaulay's 'Bunyan.'

Bunyan is almost the only writer | who ever gave to the abstract | the interest of the concrete. | In the works of many celebrated authors, | men are mere personifications. | We have not a jealous man, | but jealously, | not a traitor, but perfidy, | not a patriot, but patriotism. | The mind of Bunyan | on the contrary | was so imaginative | that personifications, | when he dealt with them, | became men. | A dialogue between two qualities | in his dream | has more dramatic effect | than a dialogue | between two human beings | in most plays. |

The style of Bunyan | is delightful to every reader, | and invaluable as a study | to every person | who wishes to obtain | a wide command over the English language. | The vocabulary is that of the common people. | There is not an expression, | if we except a few technical phrases of theology, | which would puzzle the rudest peasant. | We have observed several pages | which do not contain | a single word of more than two syllables.

FEMALES.

Extract from (the elder) William Pitt's speech on being taunted with his youth.

The atrocious crime of being a young man, | which the honourable gentleman has, | with such spirit and decency, | charged upon me, | I shall neither attempt | to palliate nor deny; | but content myself with wishing | that I may be one of those | whose follies may cease with their youth, | and not of that number | who are ignorant in spite of experience. | Whether youth can be imputed | to any man as a reproach | I will not, Sir, | assume the province of determining; | but, surely, | age may become justly contemptible, | if the opportunities which it brings | have passed away without improvement, | and vice appears to prevail | after the passions have subsided. | The wretch who, | after having seen the consequences | of a thousand errors, | continues to blunder, | and whose age | has only added obstinacy to stupidity, | is surely the object | of either abhorrence or contempt, | and deserves not | that his grey hairs | should secure him from insult.

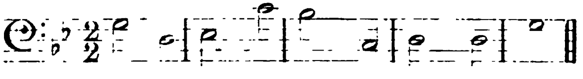
MUSIC.

(*Two hours allowed for this paper.*)

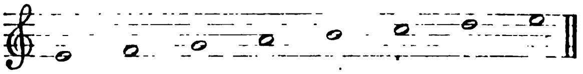
Candidates may answer the questions in either the Staff Notation or the Tonic Sol-Fa, but NOT IN BOTH. You are not permitted to answer more than NINE questions.

STAFF NOTATION.

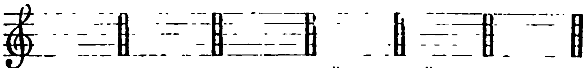
1. Write the following in the treble clef (adding the key signature) *one* octave higher :—



2. Add sharps to such notes in the following scale as will make it into the scale of E minor, with a major sixth and a major or sharp seventh :—

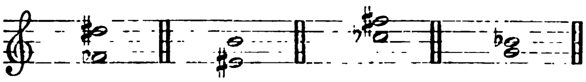


3. Write the signatures of the following keys :—

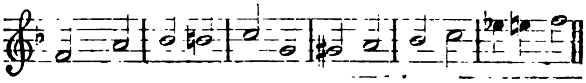


D Major. C Minor. E♭ Major. C♯ Minor. F♯ Major. A Minor.

4. Write under each of the following intervals its name (*e.g.*, major third, &c.) :—



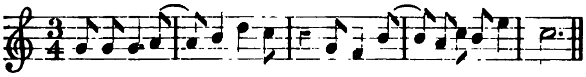
5. Transpose the following a Major third higher, *i.e.*, from F Major to A Major :—



6. Give two instances of syncopation, placing an asterisk over the syncopated notes.

7. Write out the melody in the Key of G, of the first line of 'Rule Britannia,' ('When Britain first at Heaven's command') with a crotchet for a beat or pulse.

8. Transcribe the following passage into $\frac{3}{8}$ time, halving the value of every note and rest :—



9. The Time tests, for Division IV. in schools, consist of—

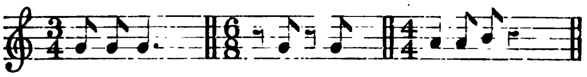
(*a*) To sing on one sound, one or more series of notes and rests in $\frac{2}{2}$, $\frac{4}{4}$, $\frac{3}{2}$, and $\frac{3}{4}$ times, which shall include dotted minims and dotted crotchets ; also a simple phrase in $\frac{6}{8}$ time ; and

(*b*) To name the time of an *easy* phrase.

Write two passages, of not more than twenty notes each, as model tests in accordance with the above requirements.

10. How would you rectify 'flatness,' 'slurring,' 'roughness of tone,' and 'straining,' in singing ?

11. Complete each of the following bars by adding one note to the end :—



12. State the meanings of the following terms—'Adagio,' 'Maestoso,' 'Bis,' 𝅗𝅥 = M. 60. Give the Italian equivalents for 'Rather slow' and 'Very quick.'

TONIC SOL-FA NOTATION.

1. Write descending Minor Scales, Lah Mode, (*a*) once with the Minor or flat seventh and the Minor or essential sixth, and (*b*) once with the Major seventh and the Minor or essential sixth.

2. Write against each of the following intervals its name (*e.g.*, Major third, &c.) :—

me to *re*^{1}, *me* to *te*, *te* to *fe*^{1}, *soh* to *ta*.

3. What is the name for (*a*) *ray* flat, (*b*) *lah* sharp, (*c*) *te* flat ?

Re-write the following in the imperfect method, *i.e.*, using Chromatic names where necessary instead of bridge-notes :—

m s ^{s}d t$_1$ l$_1$ ^{l}r f l f ^{f}s m d$_1$

4. Re-write the following in the first flat key (*i.e.*, regard the first note as *te* and so on :—

m f l s ta l l l se l te d ta l f r r d.

5. Re-write the following, halving the value of each note and rest :—

| s .s :s :- .l | l .t :- .r :- .d | :s .f :- .t }

t .l :d .t :m | d :— :— ||

6. Name the measures of the following phrases :—

(*a*)

| d^1.t : l.s | f :m | r :d.t$_1$ | l$_1$:-.s$_1$ | l$_1$.t$_1$: f.r | l$_1$.t$_1$: d ||

(*b*)

| d^1 .t : l .s : f .m | r .d : t$_1$ .l$_1$: - .s$_1$ | l$_1$ .t$_1$: f .r : d ||

(*c*)

| d : t$_1$ | t$_1$.l$_1$: s$_1$.m | f : r | t$_1$:- .r | d : t$_1$ | d :— |

7. Adapt question 7 in the Staff Notation.

8. Are voices better trained by occasional practice for a long time or by frequent practice for a short time ?

9. The same as question 9 in the staff Notation.

10. The same as question 10 in the Staff Notation.

11. Complete each of the following measures by adding one *note* at the end, and having no rests in the last pulse :—

| s .s : s :- . || :l: | l:l: | l :l | l.l : l., ||

12. The same as question 12 in the Staff Notation.

LANGUAGES.

Male candidates may answer questions in TWO Languages ; *Female* candidates in ONE only.

LATIN.

TWO hours allowed for this Paper for *Male* candidates ; THREE hours for *Female* candidates. No candidate may answer questions in both Sections I. and II.

SECTION I. (*Gallic War, Book VII.*) Translate into English:—

(1) *Consecutus id*, quod animo proposuerat, Cæsar receptui *cani* jussit, legionisque decimae, quacum erat concionatus, signa *constitere.* At reliquarum *milites* legionum, non *exaudito* tubae sono, quod satis magna valles intercedebat, tamen ab tribunis militum legatisque, ut erat a Cæsare praeceptum, retinebantur. Sed elati spe celeris victoriae, et hostium fuga, superiorumque temporum *secundis* proeliis, *nihil adeo* arduum sibi existimabant, quod non virtute consequi possent.

(2) Parse the words in Italics.

(3) Who were Clodius, Vercingetorix, Labienus, and Litavicus?

SECTION II. (*Conspiracy of Cataline.*) Translate into English: —

(1) Praeterea quorum *victoria* Sullae parentes *proscripti*, *bona* erepta, jus libertatis imminutum erat, haud sane alio animo belli eventum exspectabant. Ad hoc *quicunque* aliarum atque senatus partium erant, conturbari *rempublicam* quam minus valere *ipsi malebant.*

(2) Parse the words in Italics.

(3) Who were Manlius, Fulvia, Crassus and Lentulus ?

SECTION III. Translate into English :—

(1) (*a*)
Fertur pudicae conjugis osculum
Parvosque natos, ut capitis minor,
Ab se removisse et virilem
Torvus humi posuisse vultum :
Donec labantes consilio patres
Firmaret auctor nunquam alias dato,
Interque maerentes amicos
Egregius properaret exsul.

(*b*)
Non ferox
Hector vel acer Deïphobus graves
Excepit ictus pro pudicis
Conjugibus puerisque primus.
Vixere fortes ante Agamemnona
Multi, sed omnes illacrimabiles
Urgentur ignotique longa
Nocte, carent quia vate sacro.

(2) Scan the first four lines in extract (*b*), and mark the syllabic quantities.

(3) Decompose into their separate parts—*insperata*, *reconditum ;* and trace the origin of *generosior*, *arcanum*, and *bidentium.*

III. Translate into Latin :—

(*a*) They were saying that Tarquinius had been sent by Cicero.

(*b*) We call gods and men to witness that we have not taken up arms against our fatherland.

(*c*) Use me as either general or common soldier.

(*d*) Camulogenus, himself, the general of the enemy, was present, and encouraged them.

(*e*) They come together in great numbers, and from every quarter to the same place.

(*f*) The town wall was 1,200 paces distant from the plain.

SECTION IV. (1) Explain these expressions :—Germani *frequentes* ad eum venerunt : Est in carcere locus *quod* Tullianum appelatur : Omnes *advorsis* vulneribus conciderant: *Anceps* Janus: *Destrictus ensis* cui super impia cervice *pendet.*

(2) What are neuter passives ? What are the chief characteristics of Cæsar's *or* Sallust's style ?

(3) Criticise—Ego et Rex meus, Balbus venit proelium pugnare, Fruges arborum sunt pulchræ.

(4) Name a few verbs that govern the ablative, and a few that govern the genitive.

(5) What is the force of the affix in the following words—mensula, scriptito, calesco, and pudibundus? Give another instance of each class.

FRENCH.

Two hours allowed for this paper for *Male* Candidates; and THREE hours for *Female* Candidates.

I. Translate into English the following passages :—

(*a*) Toute fois il voulut un autre signe plus difficile et plus secret; et l'entrainant à l'écart de sa cour dans une embrasure de fenêtre, il s'entretint à voix basse avec elle sur un mystère de son âme qui travaillait sa conscience, et qui lui inspirait secrètement des doutes sur son droit au trône. Ce mystère n'avait jamais été révélé par lui à personne. La réponse inspirée de Jeanne bien qu'elle ne fût pas entendue des assistants répandit visiblement la sécurité et la joie sur le visage du Dauphin.

(*b*) Je ne puis le voir sans exciter la défiance et les plaintes des nouveaux ministres. Ah! quand ne serai-je plus reine pour être ma maîtresse! Dans le choix même de mes amis, demander avis et permission aux conseillers de la Couronne, aux Chambres, à la majorité, à tout le monde enfin—c'est à n'y pas tenir—c'est un esclavage odieux, insupportable, et ici du moins, je ne veux obéir à personne, je serai libre chez moi dans mon palais.

II. Translate into French the following passages :—

(*a*) There exists in nations, as well as individuals, an instinct of self-preservation, which warns and arrests them (even when under the dominion of the most unrestrained passions) from the perils into which they were about to rush headlong.

They seem to recoil, suddenly struck by the aspect of the abyss into which at the very moment they were rushing.

These intervals from human passions, although short and fleeting, yet allow time for events to transpire, for wisdom to return; and they afford opportunities to statesmen.

(*b*) He believed in the divinity of reason, and the omnipotence of human intelligence elevated by freedom.

(*c*) How beautiful is cultivated nature! How brilliantly and magnificently by man's care is she adorned!

(*d*) In the midst of a universal madness, nobody was astonished at what would surprise us to-day.

(*e*) They heard only a single report.

(*f*) Here it is; I was afraid I had lost it.

III. (*a*) Parse fully (1) or (2):—

(1) Alors, voyez-le toujours, ne fût-ce que pour le congédier, car j'ai dit qu'on le laissât monter.

(2) Les fossés se comblaient en vain de cadavres; elle s'obstinait à la victoire ou à la mort.

(*b*) Explain the following constructions, &c., and translate them into English :—

(1) Ah! dit-elle *en se repentant de l'avoir contristé*, prenez mon cheval.

(2) Elle se fit conduire à l'église, *où l'on chanta un Te Deum.*

(3) Sa Majesté *vient de prescrire* les mesures les plus rigoureuses.

(4) Que Votre Majesté en profite.

(*c*) What are the *three chief rules* of the agreement of the Past Participle?

(*d*) Criticise: *Je ne t'entendais que, Il est demeuré à France, Toi, Paul, dites-moi, Mon amie et la vôtre.*

(*e*) Give the primitive and future tenses of the following verbs :—Aller, dormir, mourir, pouvoir, pourvoir, dire, faire.

ADVICE TO CANDIDATES.

I. Before and during Examination.

1. Get yourself into vigorous bodily and mental health, by plenty of fresh air, exercise, and by regular living.

2. Live plainly and sparingly; above all, don't take heavy breakfasts or noon dinners. Let your chief meal be after the day's work.

3. Don't indulge in exciting beverages.

4. Until Saturday (the 1st current) answer as many Test Questions as possible; then revise work and remedy defects until the 8th. On 9th and 10th rest from study as much as possible.

5. Don't 'cram' just before the Examination, more especially on the days of Examination, and most especially between the papers.

6. Don't, in the intervals of Examination, distress yourself by comparing answers.

7. Have ready for use your small hand, large hand and map pens, black and red ink, blue, black, and red pencils, penknife and india-rubber. Let these be of the best quality.

II. At commencement of Examination.

1. Carefully peruse the printed notice issued to Candidates.

2. Fill up the required particulars at the head of your paper, *before even glancing at the questions.* (Every year many Candidates fail or seriously lose position through unheaded papers.)

3. Attend to directions at head of paper. Where you are *recommended* to answer any denoted question, take the advice as a *command.*

III. Answering in the Examination.

1. Don't deal in generalities, or write round a question. 'Padding' won't deceive an Examiner. Keep to the point.

2. Don't make random shots. These will meet with the fate of most 'forlorn hopes,' and you will only show what you DON'T know.

3. Don't spend too much time or space on ONE question; and in every case economise these as much as possible. THREE questions fairly well answered will score more heavily than TWO excellently answered.

4. Remember that this is a Teacher's Examination, and that not only in the School Management Test, but throughout the whole series of papers, your capacity for tuition as regards scientific method, logical arrangement, and lucid communication of ideas and facts is discoverable.

5. Ascertain what the question really asks. In the excitement of the moment, the most flagrant mistakes are frequently committed, and are only discovered too late to be rectified. Of course, don't pretend to misunderstand the question (if you can't answer it) and write an uncalled-for answer.

6. Don't write between the lines; such writing won't be read.

7. Where possible, begin your answers directly opposite the commencement of the corresponding questions. In other cases plainly head your answer with number of question, etc.

8. If the exigencies of space compel the division of an answer into several separated parts, plainly indicate their connection.

9. When time allows, first plan out your answer on the 'scrap' paper.

10. Consider whether a tabulated or extended answer be preferable.

11. Use diagrams and rough maps wherever possible, *e.g.*, to explain battles, or problems in Mensuration and Arithmetic. The Euclid diagrams should be placed to the north-east of the answer, and should be repeated if this extend to two pages.

12. Work the compulsory (or advised) questions first.

13. Select the questions you can best answer, even if they do not appear the most important.

14. Draw your maps at first with only moderate detail and finish. If time permit, fill in and elaborate more fully after all the other questions are disposed of.

15. *In Euclid*, space is often saved by doubling the paper from top to bottom, and placing the answer in the two thus formed columns. Don't omit the Deductions.

IV. Revision of Answers in the Examination.

1. Revise each question *as soon as finished*, not deferring this checking until end of paper. In Mathematics each step of the employed processes should be *at once* revised, even before completing the problem.

2. Don't leave the Examination Room or return your papers, until you are compelled, but revise and re-revise *ad nauseam.*

ERRATUM.—Page 438, line 30, read *probable* instead of *probably.*

ANSWERS TO QUESTIONS IN LAST MONTH'S ISSUE.

I.—*Algebra.*

(1) 8 and 2.

(2) 3 and $\frac{x+\sqrt{x^2-a^2}}{a}$.

(3) 16.

(4) 1,260.

(5) 10.

(6) 4, $\frac{1}{2}$, 8.
(7) ·0511525, ·0880456, ·0263938.
(8) $P(1 - r)^n$.
(9) 2 and 2, $\left\{\frac{ab(c^2 - 1)}{a^2 + b^2 - 2abc}\right\}^2$
(10) 15 persons and 5 shillings.
(11) 10 bought and 5 wrecked.

II.—*Mensuration.*

(1) As 1 is to 2.
(2) 5 feet.
(3) $\frac{1}{2}\sqrt[3]{2r^2h}$.

III.—*Arithmetic* (Males).

(1) Gold is 14 times as valuable as silver.

(2) B, in 54 minutes; A, in $1\frac{4}{11}$ minutes later; C, in $1\frac{7}{11}$ minutes later; D, in 4 minutes later.

(3) Legacies were £2,520; they lost £630.

IV.—*Arithmetic* (Females).

(2) $\frac{1}{4}$ and $\frac{1}{10}$. See also PRACTICAL TEACHER, p. 459, first column.

(3) 2, 200, 2,000, infinite. The less the divisor the greater the quotient. Therefore, when the divisor is the least possible (viz., 0), the quotient is the greatest possible (viz., infinity).

(4) 94 miles.

(5) $8\frac{2}{11}$ minutes past one.

(6) To find the hypotenuses of right-angled triangles, and the sides of squares of given areas. ·7071, ·7071, ·8881 nearly.

(7) $9\frac{8}{11}$ minutes.
(8) 2 feet — 7 inches.
(9) £161$\frac{7}{8}$.
(10) 350 sheep.
(11) Horse, £30; cow, £18.
(12) £3,125.
(13) £17 premium.
(14) £3,360.

ANSWERS TO CORRESPONDENTS.

DIDYMUS (Walsall).—We don't object to candid criticism; but it must be remembered that our questions are compiled not only to comply with the Syllabus, but with the style of previous questions.

DUTCHMAN (Hull).—No sets of questions on Greek or German will appear, as only an extremely small percentage of candidates is taking these languages.

J. P. (Fern St.)—We are informed that the Half-crown Fee will cover the examination of this month's questions also.

DICK SPELL (Wakefield).—No Mental Arithmetic is required from either Male or Female Candidates of the Second Year.

DISC(H)ORD.—Questions on the Alto and Tenor Staves are not now given.

PRIVATE STUDY (Chelmsford) will find that the Model Certificate Answers in the PRACTICAL TEACHER will meet his requirements.

VALEDICTORY.

Thus far, my gentle readers, we have walked together for ten moons in the pleasant paths of knowledge, with much of satisfaction (we know) to both pilgrims and guide alike. But now, having traversed the delectable territory of ACQUISITION, we halt on the confines of CERTIFICATE land, whose citizens are called TEACHERS.

A cordon of sentinel INSPECTORS prohibit thereto all access, save through the portals and halls of EXAMINATION city. Therein must ye for certain days abide, and be put to the proof by zealous Inquisitors. Whosoever among you endure to the end and are accounted worthy will receive a passport to the land beyond, ycelpt CERTIFICATE.

What joys await you there pen cannot depict, nor tongue describe, *for none know what they are.* How to comport yourselves within the city your guide, philosopher, and friend, hath already instructed you. For himself, whilst ye tarry therein, he will, with his previously obtained passport, proceed into the goodly land, and with hope await you.

That ye may be accounted meet to enter therein, to possess it, and become fellow-citizens instead of pilgrims, is the heart's desire of

THE COMPILER.

My Scholarship Answers.

BY JAMES WILLIAMS,

FRATTON STREET BOARD SCHOOL, PORTSEA.

(*First on the Scholarship List, 1888.*)

MALE AND FEMALE CANDIDATES.

Music.

TONIC SOL-FA NOTATION.

1. Re-write the following, (1) halving the value of every note and rest, and (2) again, doubling the value of every note and rest.

| m :- .f | s :— | :r | d :— ||

(1) Half value.

| m .,f : s | .r : d ||

Double value.

| m :— | — : f | s :— | — :— | : | r :— | d :— | — :— ||

2. Describe the intervals (major third, &c.) formed by the following pairs of notes.

(1)	(2)	(3)	(4)
f	d'	ta	ta
t_1	re	s	r

(2) (1) Imperfect 5th. (2) Diminished 7th. (3) Minor 3rd. (4) Minor 6th.

3. What is the name (1) for *fah* sharp, (2) for *te* flat, (3) for *doh* sharp, (4) for *lah* sharp?

(3) (1) Fe, (2) Ta (pronounced *taw*), (3) De, (4) Le.

4. Describe the measures formed by the following accents:—

(1) | : ¦ : | : | : }
(2) | : : ¦ : : ||
(3) ¦ : : | : : | : : | : : |

(4) (1) Four-pulse, fourth form. (2) Three-pulse, primary. (3) Six-pulse, primary.

LIST OF BOOKS USED.

Arithmetic.—Hamblin Smith (Rivington); Barnard Smith (Macmillan).

Algebra.—Mansford's School Algebra (Hughes); Todhunter's Smaller (Macmillan); Hamblin Smith (Rivington).

Euclid.—Todhunter (Macmillan); Amner's 'How to work Euclid Deductions' (Moffat).

Mensuration.—Todhunter.

History. — Ross's Smaller, Curtis's Date Book (Simpkin and Marshall); Hume (Murray); Green's History of English People (Macmillan); Short Biographies (Stewart).

Grammar.—Davidson and Alcock (Allman); Evan Daniel's English Literature (Nat. Society).

Geography. — Lawson's (Collins); Cornwall's; Collins' (*a*) National Atlas; (*b*) Student's Atlas of Physical Geography; Philip's Student's Atlas.

French.—Chardenal's 1st and 2nd Course (Collins); Cassell's Dictionary; Selections from Edmond About (Hachette).

School Management.—Gladman (Jarrold).

Music. — Old Notation:—Stimpson's Singing-class Book (Collins); Watson's Manual of Music (Simpkin and Marshall). New Notation:—Standard Course; Musical Theory, Books I. and II.; Pupil Teachers' Handbook of Questions and Answers, by Watson. All published by Curwen.

General.—Twelve Years' Scholarship Questions (Moffat); Practical Teacher (Hughes).

French.

1. Translate into English—

J'ai toujours aimé à parcourir la scène physique des lieux habités par les hommes que j'ai connus, admirés, aimés ou révérés, parmi les vivants comme parmi les morts. Le pays qu'un grand homme a habité et préféré, pendant son passage sur la terre, m'a toujours paru la plus sûre et la plus parlante relique de lui-même ; une sorte de manifestation matérielle de son génie, une révélation muette d'une partie de son âme, un commentaire vivant et sensible de sa vie, de ses actions et de ses pensées. Jeune, j'ai passé des heures solitaires et contemplatives, couché sous les oliviers qui ombragent les jardins d'Horace, en vue des cascades éblouissantes de Tibur ; je me suis couché souvent le soir, au bruit de la belle mer de Naples, sous les rameaux pendants des vignes, auprès du lieu où Virgile a voulu que reposât sa cendre, parce que c'était le plus beau et le plus doux site où ses regards se fussent reposés.

Olivier, olive-tree; *éblouissant*, dazzling; *rameau*, branch; *cendre*, ashes.

(1) I have always liked to wander over the actual places where men have lived that I knew, admired, loved, or honoured, among both living and dead. The country which a great man has inhabited and preferred, during his sojourn upon earth, has always appeared to me the most certain and eloquent relic of him; a kind of material manifestation of his genius, a silent revelation of a part of his soul, a vivid and reasonable comment on his life, actions, and thoughts. When young I passed many hours of thoughtful seclusion, lying under the olives which overshadow the gardens of Horace, in sight of the dazzling cascades of the Tiber; at evening I have often lain down within hearing of the beautiful bay of Naples, under the hanging vine-branches, near the place where Virgil wished his remains might rest, because it was the most beautiful and pleasant spot that he had ever seen.

2. Parse in the above: *J'ai connus, paru, muette, je me suis couché, pendant, reposât.*

(2) *J'ai connus.*

Je—pers. pron., sing. num., first pers., com. gend., nom. to *ai connus*.

ai—auxiliary of perf. tense to *connus*.

connus—past part. of *connaître*, plural num., masc. gend., agreeing with its direct obj. *que*.

ai connus—verb irreg. trans., act. voice, indic. mood, perf. tense, ai agreeing in num. and person with the nom. *je*, connu with the obj. *que* in num. and gend.

paru—past part. of paraître, used with *a* to form the predicate of *pays*.

muette—adj. of qual., sing. num., fem. gender, qualifying and agreeing with *révélation*.

je me suis couché.

je—pers. pron., sing. num., first pers., common gender, nom. case to suis couché.

me—pers. pronoun reflexive, sing.; first, common gender, obj. gov. by couché.

suis—(= ai) auxil. of perf. tense.

couché—past part. of *coucher*.

suis couché—verb reg. trans. reflexive, indic. mood, perf. tense, sing. first agreeing with *je*.

pendants—adj. of qual., plur. num., masc. gender, qualifying and agreeing with *rameaux*.

réposât—verb reg., first conj.. intrans., subj. mood, imperf. tense, sing. num., third pers., agreeing with *cendre*.

3. How are the plurals of nouns ending in *x*, *eu*, *al*; and the feminines of adjectives ending in *f*, *x*, *el*, *eur*, generally formed? Give an example in each case.

(3) *Plurals.*
(*a*) Nouns ending in *x* are same in plural.
(*b*) ,, ,, *eu* add x to form plural.
(*c*) ,, ,, *al*, remove l, and add ux to form plural.
Examples—(*a*) Prix (= prize); plural = prix.
(*b*) Feu (= fire); ,, = feux.
(*c*) Cheval (= horse); plural = chevaux.

Feminines.
(*a*) Adj. ending in *f*, change f to *ve* for Feminine.
(*b*) ,, ,, *x*, change x to *se* for Feminine.
(*c*) ,, ,, *el*, add *le* for Feminine.
(*d*) ,, ,, *eur*, add *e* ,,
Examples—(*a*) Neuf (= new), neuve.
(*b*) Orageux (= stormy), orageuse.
(*c*) Cruel (= cruel), cruelle.
(*d*) Majeur (= major, greater), majeure.

4. Write in French: *let him have, we had been, they spoke, I was finishing, he receives, we sold*, and give the participles of *avancer, mourir, venir, valoir, battre, croire.*

(4) Laissez-l'avoir, nous eûmes été, ils parlaient, je finissais, il reçoit, nous vendions. *Participles*, avancé, mort, venu, valu, battu, cru.

5. Translate into French: (*a*) lend me your pencil, (*b*) here is the gentleman of whom you speak, (*c*) every country has its customs, (*d*) I want a French grammar, (*e*) allow me to tell you, (*f*) I am very glad to see you in good health.

(5) (*a*) Prêtez-moi votre crayon.
(*b*) Voici le monsieur dont vous parlez.
(*c*) Tout pays a ses mœurs.
(*d*) Il me faut une grammaire française.
(*e*) Laissez-me vous dire.
(*f*) Je suis bien aise voir que vous vous portez bien.

School Management.

(*Three hours allowed for this paper with that on Music.*)

[All Candidates must answer question 1, and may not answer more than *eight* other questions.]

1. Write full notes of a lesson on *one* of these subjects:—

(1) (For infants.) The square and its properties (either by paper-folding or by drawing).
(2) Adverbs and adverbial phrases.
(3) The rule of three by the method of unity.

(1) First Lesson on Rule of Three to *Standard V.* *Time*, 25 minutes. *Apparatus*—Blackboard, &c.; and class provided with slates.

MATTER TAUGHT.	METHOD OF TEACHING.
Principles involved:— 1. To *increase* the value of a fraction increase the *numerator*; to *decrease*, increase the *denominator*. 2. Method of 'cancelling.' *Blackboard*:— If 15 lbs. of sugar cost 4s. $4\frac{1}{2}$d. find the cost of 26 lbs. 4s. $4\frac{1}{2}$d. = 105 half-pence. Cost of 15 lbs. = 105 h-p. ,, 1 = $\frac{105}{15}$ $\therefore$,, 26 = $\frac{105 \times 26}{15}$ $\frac{\overset{7}{\cancel{105}} \times 26}{\cancel{15}} = \overset{\text{h-p.}}{182} = \overset{\text{d.}}{91} = \overset{\text{s.}}{7}\ \overset{\text{d.}}{7}$	(The class are supposed to know the Standard V. work in fractions.) The best way to teach a new rule in Arithmetic is to work a few simple examples involving that rule. Thus, propose to class the problem, 'If 15 lbs.,' &c. (see other column). Make a statement of what we know *putting last the quantity of the same kind as the required answer.* Then cost of 1 lb. will be 15 times less (educed). Elicit that we divide by 15, *i.e.*, make 15 the denominator. Cost of 26 lbs. is 26 times greater than 1 lb. Educe that we multiply the top of the fraction. Copy this fraction below the sum and cancel; = 182 halfpence = 7s. 7d. Three or four sums worked on blackboard; then proceed to slate-work.

2. Show what is the proper use of a blackboard as an aid to recapitulation. Give a specimen of the sketch which should appear on the board at the end of an object lesson.

(2) The blackboard should show at the end of the lesson a complete summary of what has been taught. Each result as arrived at in the course of the lesson should be written on the board, and questions should be asked on each section before attacking a fresh portion of the subject. On finishing every salient point will appear on the black-board, and, prompted by the sketch before their eyes, the class will give well-arranged answers to the teacher's recapitulatory questions. In the upper classes an essay founded on the blackboard skeleton would be an appropriate conclusion, or would supply a theme for home-work.

Specimen Sketch. (To Standard IV. or V.)

COAL.

1. *Description.*—Black; hard; brittle; splits easily in certain directions (cleavage).
2. *History.*—Once was vegetation in swampy soil and tropical climate. Land submerged and buried by sand and mud. Land afterwards rose, and fresh vegetation grew there. Many layers thus formed. Great pressure by earth above. Each growth = a seam or layer of coal.
3. Very plentiful in England. Iron and coal the cause of England's greatness.
4. *Use.*—(*a*) Fuel for house, factory, locomotive, steamship.
(*b*) Gas, coke, tar, pitch, dyes and scents.
(Coal baked in retorts or ovens.)

3. Explain what may be done by the help of reading-books to impart geographical and historical information in schools in which geography and history are not taken as class subjects.

(3) The use of geographical and historical readers is, in the hands of a good teacher, as effective as formal lessons on the subjects would be. The teacher should have clear maps hung about the room and brought into use when reading from the geographical readers, and often also when reading history. This, with explanations and illustrations on the part of the teacher, will secure a good hold on the subject.

4. Classify the capital letters according to the similarity of their forms, and the order in which you would teach them. Give specimens of any six capital letters, carefully written, so as to illustrate their proportions and the rules for their formation.

A E T H I N

(4)

T, F; S, L, Z; I, J; P, R, B; O, D, Q, U, Y, V; E; C, G, H, K, X; A, M, N, W.

The above order represents generally the order in which I should teach them, but several groups would be worked abreast of each other, for instance C would be taught after O, then G, then A, D, Q, and H.

Ecclesiology

Cowards die many times before their deaths,

The valiant never taste of death but once.

7. Describe some varied exercises in mental arithmetic suitable for scholars, either—(*a*) In an infant class, or (*b*) in the Fourth Standard.

(7) Standard IV. being acquainted with the various weights and measures, an infinite variety of questions can be proposed. Samples:—

(1) Cost of 3 lbs. 5 oz. at 2d. per oz.
(2) How many yards in a mile?
(3) Reduce 6 guineas to farthings.
(4) How many journeys must I make round a room 22 yards square to go a mile?
(5) How many square inches in 4 square yards?
(6) Cost of 9st. 7lbs. at 3s. per st.
(7) How many times is 6s. 8d. contained in £1 (thus leading up to aliquot parts)?
(8) One acre of turfing at 1d. per sq. yard.

9. On receiving new scholars in the school, what is the best way of deciding in what class to place them? Give reasons for your answer.

(9) The teacher will in most cases be guided by the attainments of the new scholar; but circumstances alter cases, and it is better sometimes to deviate from this rule. A child may be backward for his age, but it is often better to strain a point and not hurt his feelings and destroy his self-respect by placing him among scholars much younger than himself. Or he may be a notorious character, and then, in the interest of the school at large, we should put him where he would be least contaminating.

11. What are the best expedients you know for quickening and securing the attention of a languid or disorderly class?

(11) These two faults are rarely attributable to the children themselves; usually the teacher is to blame, sometimes the architect of the school. Let the teacher see that both the lesson and his treatment of it are suited to his pupils, and cultivate a cheerful and encouraging style of teaching. The languor may be owing to prolonged sitting or standing, in which case give a change of position and run through a few simple movements, such as 'Hands One' (up), 'Two' (out straight in front), &c. Or the time-table may be badly arranged, making the lessons too long, or putting two similar lessons together; the remedy here lies with the head master. The teacher might pay attention also to the windows, &c., with considerable advantage.

A disorderly class. Here the teacher must not go on with his lesson till he *has* order. Make one command, and *see that all obey it before giving another.* If there be any wilful disobedience the teacher should resort to vigorous measures. Once the boys know his mettle the teacher will have no further trouble on this point.

14. 'The answers given by children to questions are too often confined to single words.' Why should this be objected to, and what means can be adopted to encourage children to make complete statements and sentences of their own?

(14) A question is put either—
(*a*) To see how much the catechumen knows;
(*b*) To lead his thoughts in a certain direction; or,
(*c*) To make him lay out his stock of knowledge in orderly fashion.

It is manifest that all these objects are frustrated if the reply is given in a single word.

The teacher should not put questions which admit of being answered by a simple 'Yes' or 'No,' or that can be answered by a chance shot. He should require all replies to be given in grammatical language, and frequently also that the reason of the reply be set forth. He should also remember that his own style of conversation will influence that of his pupils; hence the necessity of a good example.

This insisting on logical replies is not only a valuable discipline for the mind, but it clears the way for composition in the upper standards.

16. Name some poetical pieces or extracts suited for recitation in any three of the classes, either in an infant school or in a school for older children.

(16)

STANDARD I.
Freddy and the Cherries.
Child's First Grief.
Boy who told a Lie.

STANDARD II.
Menagerie under the Cherry-tree.
Casabianca.
Miller of the Dee.

STANDARD III.
Ballad of Sir John Franklin.
Wreck of the Hesperus.
Battle of Blenheim.

STANDARD IV.
Lochinvar.
Lord Ullin's Daughter.
Fidelity.

STANDARDS V., VI, AND VII.
Eve of Quâtre Bras.
Trial Scene (Merchant of Venice).
Wolsey's Farewell (Henry VIII).

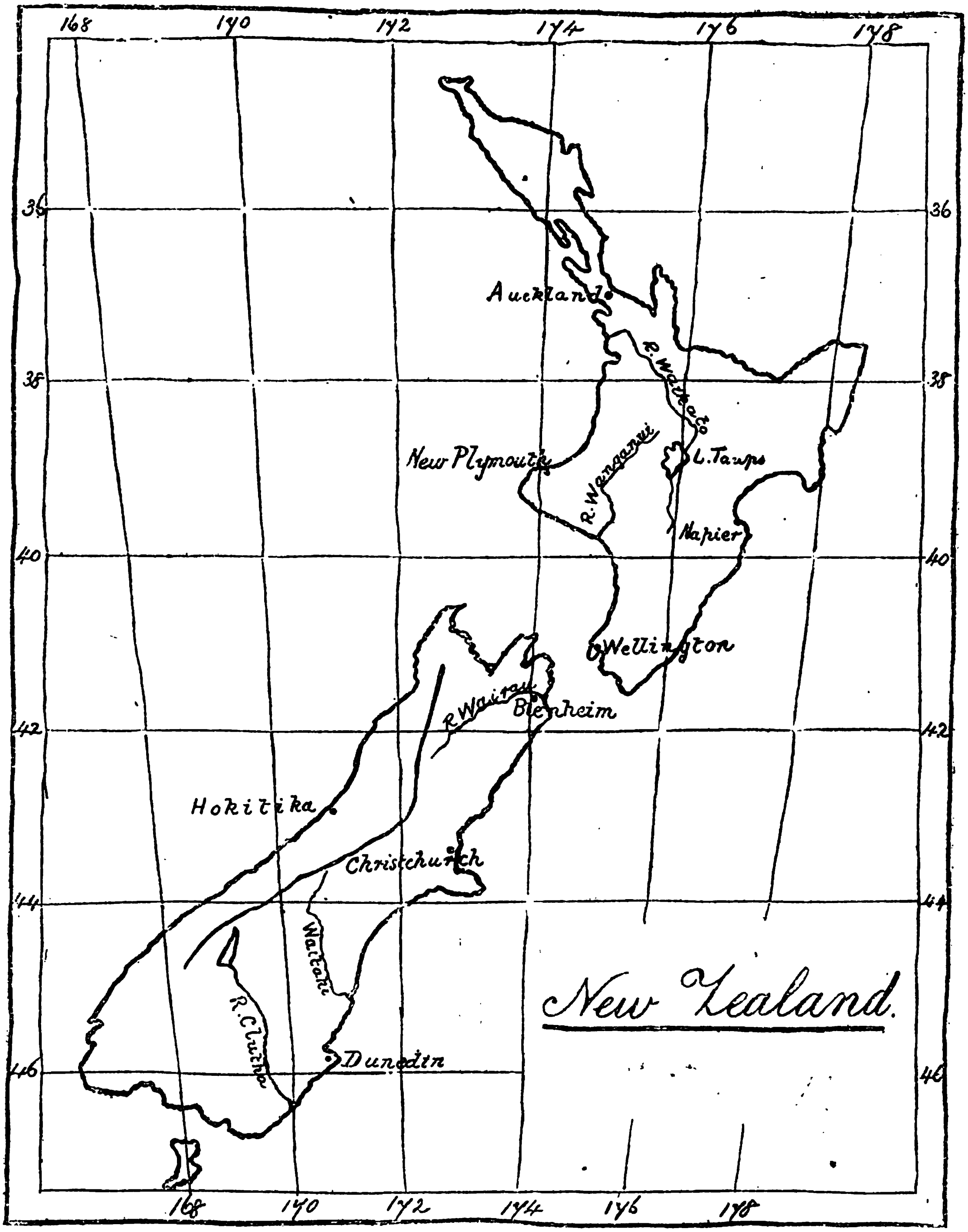
Geography.

(*Three hours allowed for this paper.*)

[All candidates must draw a map. They may answer *five* questions in each of the two subjects, but not more.]

1. Draw an outline map of (*a*) Cape Colony; *or*, (*b*) New Zealand; *or*, (*c*) France; showing the chief rivers and towns and inserting the lines of latitude and longitude.

(1) Map of *New Zealand.*



Blue ink for Coasts, Rivers and Lakes; red ink for Boundaries (if any). Blue lead shading round coast, made uniform by smearing with blotting paper.

2. Name some country in the same latitude as England, and compare the climate, people, and productions with those of our own country.

(2) *Manitoba* is in about the same latitude as England. The *climate* is drier than in England and more extreme, owing to its position in the heart of the continent. *People.*—Besides the native Indians, who are, however, retiring towards the Rockies, there are English, Scotch, and French settlers. The proceedings of the local legislature can be carried on in either English or French. *Productions.*—The soil is very rich and produces *wheat* in abundance, beside vegetables and root crops. The grass, too, is well adapted for feeding stock of all kinds.

3. State briefly what is meant by constant winds and ocean currents. The Gulf Stream is said to influence the climate of these islands. How would you explain this?

(3) Constant winds and currents are those which flow in the same direction the whole year through. Such are the *Trade Winds*, the *Gulf Stream*, and the *Equatorial Currents*

of the Atlantic and Pacific. The *Gulf Stream* influences our climate not so much by the direct action of its waters as by the heat which it imparts in its early course to the winds blowing over it. It lies just in the track of the Return Trades, *i.e.* our most common wind, the S.W., and the warmth is brought to us in two ways.—(1) The higher temperature of the wind itelf. (2) The moisture it contains. When water evaporates it carries off much heat, and this heat is released in our country when the vapour is precipitated as rain.

5. Where are Khartoum, Herat, Munich, Washington, Saragossa, Sedan, Utrecht, and Delhi? Give a short description of one of these places.

(5) *Khartoum* at the junction of the Blue and White Niles; in Nubia.

Herat in N.W. of Afghanistan, commanding the road to Cabul (and thence to India through the Khyber Pass).

Munich on the Iser, tributary of the River Danube. Capital of Bavaria.

Washington, capital of United States, on River Potomac, about 80 miles from Chesapeake Bay. Contains some fine public buildings, especially the Capitol, but there are no manufactures of importance.

Saragossa, on the Ebro, in N.E. of Spain.

Sedan on the Meuse, in N.E. of France.

Utrecht on the Old Rhine.

Delhi on the Jumna; in the Punjaub, India.

6. What is the 'Solar System'? Draw a diagram to illustrate your answer.

(6) The *Solar System* is that family of heavenly bodies comprising the sun and the various masses subject to its influence. These subject bodies comprise,—*Eight large Planets*, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune; 150 *Smaller Planets* (the Asteroids) revolving round the Sun between the orbits of Mars and Jupiter; myriads of *comets* and *meteors*; and the peculiar *Zodiacal Light*, supposed to be a belt or ring of nebulous matter. The planets large and small, and most of the comets and meteors, revolve round the Sun in elliptical paths, the comets following the most eccentric course.

MALE CANDIDATES.

Algebra.

5. Simplify $\dfrac{a^3 - b^3}{a^2 + ab + b^2} - \frac{1}{2}\left\{a - 3b - (3b - a)\right\}$

Determine c and d so that in the product of $x^2 + x + 1$ and $x^3 + cx^2 + dx + e$ the co-efficients of x^4 and x^3 may vanish.

(5) (1st) $= \dfrac{(a - b)(a^2 + ab + b^2)}{a^2 + ab + b^2} - \dfrac{a - 6b + a}{2} =$

$a - b - a + 3b = 2b$. Ans.

(2nd)

$$\begin{array}{l} x^3 + cx^2 + dx + e \\ x^2 + x + 1 \\ \hline x^5 + cx^4 + dx^3 + ex^2 \\ \qquad x^4 + cx^3 + dx^2 + ex \\ \qquad\qquad x^3 + cx^2 + dx + e \\ \hline x^5 + (c+1)x^4 + (c+d+1)x^3 + (c+d+e)x^2 + (d+e)x + \end{array}$$

For the coefficients of x^4 and x^3 to vanish they must be $= 1$. We therefore solve $c + 1 = 1$; $c + d + 1 = 1$. Evidently $c = 0$; and $d = 0$. Ans.

6. Show that the L.C.M. of two algebraical expressions is their product divided by their G.C.M.

Find the G.C.M. and L.C.M. of $6a^3 - 5a^2x - 6ax^2$, $4a^2x - 12a^2x^2 + 9ax^2$, and $6a^2x - 13ax^2 + 6x^3$.

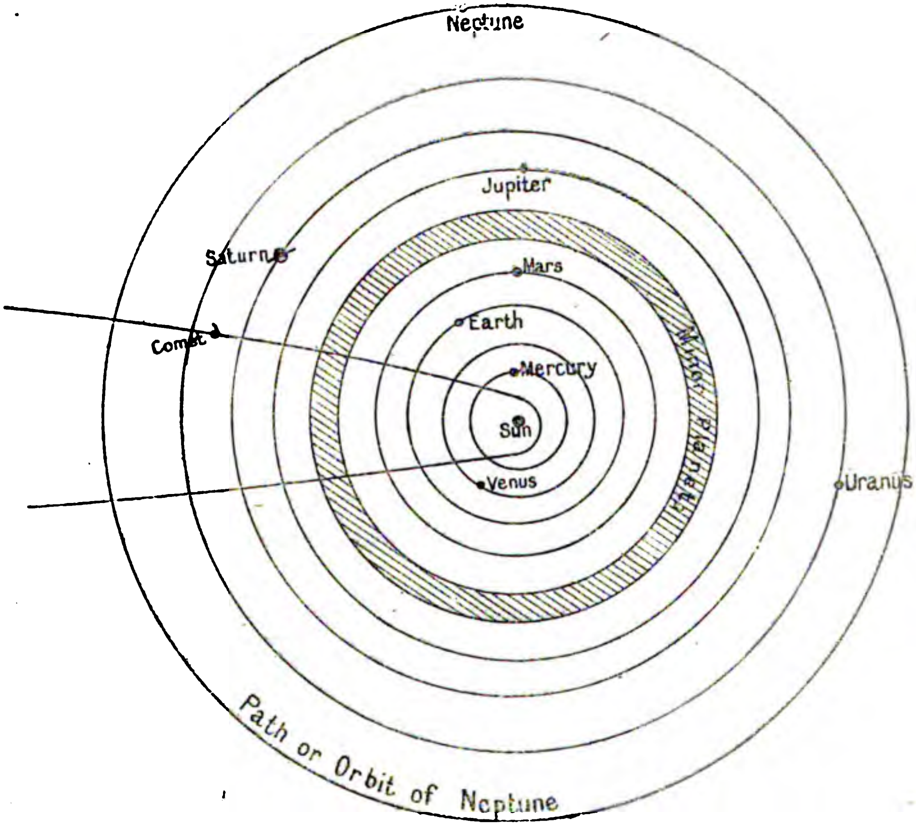
(6) (1st) Let A and B be two expressions; g their G.C.M. and let $A = ag$; $B = bg$.

Then the L C.M. is $abg = \dfrac{agbg}{g} = \dfrac{AB}{g}$. Q.E.D.

(2nd)

$$\begin{aligned} 6a^3 - 5a^2x - 6ax^2 &= a(3a + 2x)(2a - 3x) \\ 4a^2x - 12a^2x^2 + 9ax^2 &= ax(2a - 3x)(2a - 3x) \\ 6a^2x - 13ax^2 + 6x^3 &= x(3a - 2x)(2a - 3x) \end{aligned}$$

$$\left.\begin{aligned} \text{G.C.M.} &= 2a - 3x \\ \text{L.C.M.} &= ax(2a - 3x)^2(3a + 2x)(3a - 2x) \end{aligned}\right\} \text{Ans.}$$



7. *Prove* that $\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$, where the letters denote *any* numbers.

Simplify $\frac{3x - 4y}{4x + 5y} - \frac{4x - 5y}{5x + 6y} + \frac{1}{20}$.

(7) (1st) Denote $\frac{a}{b}$ by x; $\frac{c}{d}$ by y. Then $a = bx$; $c = dy$.

Multiply first pair by second, each by each; then $ac = bdxy$ + bd, then $\frac{ac}{bd} = xy = \frac{a}{b} \times \frac{c}{d}$. Q.E.D.

(2nd) =

$$\frac{20(3x-4y)(5x+6y)-20(4x-5y)(4x+5y)+(4x+5y)(5x+6y)}{20(4x+5y)(5x+6y)}$$

$$= \frac{20(15x^2-2xy-24y^2-16x^2+25y^2)+20x^2+49xy+30y}{20(4x+5y)(5x+6y}$$

$$= \frac{50y^2+9xy}{20(4x+5y)(5x+6y)}. \text{ Ans.}$$

8. Solve the equations—

(1) $\frac{2x+7}{26} - \frac{x-8}{39} + \frac{x}{13} = 1\frac{1}{2}$.

(2) $\left.\begin{array}{l} \frac{11x}{9} = y - 2 \\ \frac{x}{3} - \frac{y}{13} = 2 \end{array}\right\}$

(3) $\frac{3x}{x-2} + \frac{x-1}{x-5} = 8$.

(1) (1) Mult. by 78; $6x + 21 - 2x + 16 + 6x = 117$

Collect and divide. $10x = 80$; $\underline{x = 8}$. Ans.

(2) Mult. 1st by 9; 2nd by 39. $11x = 9y - 18$ I.
$13x = 3y + 78$ II.

" II. by 3. $39x = 9y + 234$
Subtract I. $11x = 9y - 18$
$28x = 252$; $x = 9$
Substitute in I. $99 = 9y - 18$
$x = 9$; $\underline{y = 13}$. Ans.

(3) $3x(x-5) + (x-1)(x-2) = 8(x-2)(x-5)$

$3x^2 - 15x + x^2 - 3x + 2 = 8x^2 - 56x + 80$

Transpose $-4x^2 + 38x = 78$

$\div -4$ and complete sq. $x^2 - \frac{19x}{2} + \frac{361}{16} = -\frac{39}{2} + \frac{361}{16} = \frac{49}{16}$

Sq. root and transpose. $x = \frac{19}{4} \pm \frac{7}{4} = \underline{6\frac{1}{2} \text{ or } 3}$. Ans.

9. The accounts of a school showed a debt which was paid off by three managers A, B, C. A paid half the debt and £2 more; B paid half the remainder and £7 more; C paid half of what then remained and £8 more, which just cleared off the debt. What did each pay?

(9) Let x = the whole debt. A paid $\frac{x}{2} + 2 = \frac{x+4}{2}$

1st remainder $= \frac{x}{2} - 2 = \frac{x-4}{2}$. B pays $\frac{x-4}{2 \times 2} + 7$

leaving $\frac{x-4}{2 \times 2} - 7 = \frac{x-32}{4}$

C pays $\frac{x-32}{4 \times 2} + 8$. It is evident from the statement, that

$$\frac{x-32}{4 \times 2} = 8$$

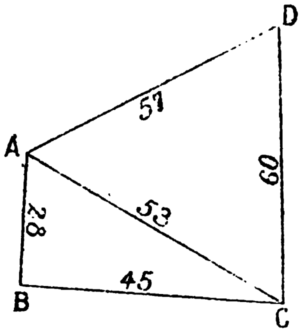
$$x = 64 + 32 = 96$$

C pays $8 \times 2 = £16$
A " $\frac{96}{2} + 2 = £50$
B " $96 - 16 - 50 = £30$

$\left\{\begin{array}{l} \text{A, £50.} \\ \text{B, £30.} \\ \underline{\text{C, £16.}} \end{array}\right.$ Ans.

Mensuration.

10. The sides of a field, A B C D, taken in order, are 28, 45, 60, and 57 yards; the angle A B C is a right angle. Find the area of the field in square yards, correct to two places of decimals.



(10) $AC = \sqrt{(28)^2 + (45)^2} = \sqrt{784 + 2025} = \sqrt{2809}$
$= 53$ yds.

Area of DAC;

Half-sum of sides = 85

Area $= \sqrt{85 \times 25 \times 28 \times 32}$
$= \sqrt{17 \times 5 \times 5 \times 5 \times 4 \times 7 \times 4 \times 2 \times 2 \times 2}$
$= 5 \times 4 \times 2 \times \sqrt{1190}$
$= 40\sqrt{1190}$ sq. yds.
$= 40 \times 34{\cdot}4963 = 1379{\cdot}85$ sq. yds.

To this add ABC $= 28 \times 45 \times \frac{1}{2} = 630$

Answer $= \underline{2009{\cdot}85}$ sq. yds.

11. The area of a circle is 38·5 square feet. Find the side of a square whose perimeter is equal to the circumference of the circle. ($\pi = \frac{22}{7}$).

(11) $38{\cdot}5 = \frac{77}{2}$ sq. ft. $= \frac{(\text{radius})^2 \times 22}{7}$

$(\text{radius})^2 = \frac{77}{2} \times \frac{7}{22} = \frac{49}{4}$

radius $= \frac{7}{2}$ ft.

Circumference $= \frac{7}{2} \times \frac{2 \times 22}{7} = 22$ ft.

Side of Square $= \frac{22}{4} = \underline{5\frac{1}{2} \text{ ft.}}$ Ans.

How my School was Examined.

BY THE

HEAD MASTER OF A COUNTRY SCHOOL.

Reading.

STANDARD I.

The Inspector took two of the reading books, and the pupils came in order and read from them.

The pieces were not taken consecutively, and several read the same paragraph.

To test if they were saying the lessons from memory, the Inspector pointed to single words in different parts to be named.

STANDARDS II.—VII.

The pupils came in batches of a dozen, and read alternately from the books used in the school.

Writing.

STANDARD I.

The teacher was allowed to repeat the words after the Inspector.

Words.

Sparrow, thief, chain, sprang, plates, doll, rabbit, nest, water, vessel.

STANDARD II.

In this Standard, and also Standards III. and IV., the last sentence in the Dictation was taken from another paragraph. The teachers of the classes were allowed to repeat the dictation after the Inspector.

Dictation.

STANDARD II.

Then I have had to struggle with great storms, to bear heavy rains, to shudder as the lightning played around me, to fight my way and hold my own in the teeth of foes, like frost and fly and grub.

You love your fruit.

STANDARD III.

They are fine fruit, so juicy and sweet. I have carefully preserved the stone, and I will plant it, and rear a tree.

Good! replied the father; that is acting prudently and caring for the future as becomes a farmer.

Edmund answered frankly.

STANDARD IV.

Behold! he was forthwith rich, and reclined on a soft mat, and was clothed in a robe of silk. Now it so happened that the Emperor passed that way. Before him went couriers on horse and foot, and he was surrounded by attendant courtiers, who held over his head a magnificent umbrella, glittering with gold.

Here is a cloud actually able to resist my power.

Composition.

STANDARD V.

Mr. Matthews, the ventriloquist, was once on board a steamer. He stood with several other gentlemen watching the machinery. Seeing the engineer down below he determined to play a trick upon him. He began to squeak, as if the machinery wanted oiling. The engineer took his oil can, and proceeded to oil the squeaking part. When he got there, another part began to squeak, and then another. The engineer now became suspicious, and went and stood behind Mr. Matthews. Presently Mr. Matthews squeaked again. The engineer put the spout of his oil can behind his neck, and squirted the oil down his back, saying, 'There! I reckon your machinery won't want oiling again just yet.'

STANDARDS VI. AND VII.

Each boy in these standards had a different subject for composition, and the following were the subjects:—

STANDARD VI.

1. Play and Work.
2. Pocket Knife.
3. Money.
4. Boots.
5. The Elephant.
6. Bees.
7. Stars.
8. The Rose.
9. Life of an Engine Driver.
10. Birds.
11. Our Cat.
12. A Good Education. What I mean to gain by it.
13. A letter to a boy at the North Pole about the harvest field.

STANDARD VII.

1. History of a Pair of Shoes.
2. Music.
3. Work, and what I meant to do when I grew up.
4. Life of Lord Nelson.
5. The Solar System.

Arithmetic.

STANDARD I.

1. 120 + 63 + 204 + 170 + 19. 576. Ans.
2. From 401 take 156. 245. Ans.
3. From 310 take 121. 189. Ans.

The teacher was allowed to repeat the numbers. Two boys, who had one sum right and two nearly right, were asked two tables, and on answering correctly they passed.

STANDARD II.

A.

1. From 12,050 take 8,907. 3,143. Ans.
2. Divide 16,428 by 9. 1,825 + 3. Ans.
3. 9,076 × 89. 807,764. Ans.

B.

1. From 14,028 take 7,909. 6,119. Ans.
2. 15,023 ÷ 8. 1,877 + 7. Ans.
3. 8,097 × 680. 5,505,960. Ans.

The teacher was allowed to repeat the numbers.

STANDARD III.

There were four different cards, and each card contained three mechanical sums, viz., long division, compound addition, and compound subtraction, and a problem.

The following was one of the long division sums:—
Divide a quarter of a million by 29.
8,620 + 20. Ans.

The following were the problems:—

1. In the third standard there were 40 boys. One-fourth of them got 4 sums right; 15 got 3 right; 10 got 2 right; and all the rest 1 right. How many sums were there right altogether? 110 sums. Ans.

2. Three dozen chairs and 7 tables cost 400 shillings. Each table cost 16 shillings. What was the price of each chair? 8 shillings. Ans.

3. A man went for a three weeks' holiday. He spent £2 17s. 6d. the first week, and £2 12s. 6d. the second week. He had then spent 30s. more than half his money. How much had he left for the third week? £2 10s. Ans.

4. John had 5s. 3$\frac{1}{2}$d., Tom had 3s. 6$\frac{1}{2}$d., and Mary had 3s. 2d. How much must John give to Tom and Mary so that they may each share alike?
5$\frac{1}{2}$d. to Tom and 10d. to Mary. Ans.

STANDARD IV.

There were four different cards.

1. Reduce 79 acres 3 roods 20 poles 5$\frac{1}{2}$ yards to square yards. 386,600$\frac{1}{2}$ sq. yds. Ans.

2. Divide seven thousand and sixty pounds eighteen shillings and ten pence by seventy-three.
£96 14s. 6d. + 4d. Ans.

3. Find the cost of 70 couples of rabbits at 1s. 9d. each. £13 16s. 6d. Ans.

4. If a man undertook to cut 27 lengths of 7$\frac{1}{2}$ inches out of a plank 5$\frac{1}{2}$ yards long, how much too short did he find the plank? 4$\frac{1}{2}$ inches. Ans.

1. Divide one thousand and seventy-six pounds four shillings and three pence three farthings by five hundred and twenty seven.
£2 0s. 10d. + 247 q. Ans.

2. £19 19s. 11$\frac{3}{4}$d. × 749.
£14,979 4s. 4$\frac{3}{4}$d. Ans.

3. How many times will a clock tick in one day, if it tick once every half second?
172,800 times. Ans.

4. How many lbs. of tea at 3s. 4d. per lb. will cost the same as 150 lbs. of coffee at 1s. 4d. per lb.?
60 lbs. Ans.

1. Reduce seven hundred and two thousand and fifty-nine ounces to tons, &c.
19 tons 11 cwt. 3 qrs. 2 lbs. 11 oz. Ans.

2. Multiply £71 9s. 10$\frac{1}{4}$d. by 186.
£13,297 12s. 10$\frac{1}{2}$d. Ans.

3. If it cost £290 14s. to supply suits of clothes to a company of seventy-six soldiers, how much would it cost for one suit? £3 16s. 6d. Ans.

4. If a man step 2 ft. 8 in., how many such steps will he take in a mile? 1,980 steps. Ans.

1. Divide seventy-six thousand and six pounds nineteen shillings and four pence by thirty-eight.
£2,000 3s. 8d. Ans.

2. Reduce 1,723,661 drams to tons, &c.
3 tons 13 lbs. 13 drs. Ans.

3. What are a man's wages for a year (313 working days) at 3s. 6d. per day? £54 15s. 6d. Ans.

4. A man bought 30 sheep for 75 guineas, and sold them for £90. How much did he gain on each sheep? 7s. 6d. Ans.

STANDARD V.

There were three different cards.

1. Find the cost of 1,014 articles at £7 18s. 10$\frac{1}{2}$d. each. £8,054 19s. 3d. Ans.

2. Bill:—

21 lbs. mutton at 9$\frac{1}{2}$d. per lb.;
8$\frac{1}{2}$ lbs. beef at 10d. per lb.;
7$\frac{1}{2}$ lbs. lamb at 11$\frac{1}{2}$d. per lb.;
49 lbs. veal at 5d. per lb.;
56 eggs at 16 for 1s.

16s 7$\frac{1}{2}$d. + 7s. 1d. + 7s. 2$\frac{1}{4}$d. + £1 0s 5d. + 3s. 6d.
= £2 14s. 9$\frac{3}{4}$d. Ans.

3. If 18 men can do a piece of work in 13 days, how long will it take 27 men to do it?
8$\frac{2}{3}$ days. Ans.

4. Add $\frac{2}{3}$, $\frac{1}{4}$, $\frac{2}{7}$, $\frac{1}{8}$. 1$\frac{55}{168}$. Ans.

1. Find the cost of 206 tons 7 cwt. at £3 4s. 7d. per ton. £666 6s. 9$\frac{1}{4}$d. Ans.

2. Bill:—

27 lbs. sugar at 7d. per lb.;
9$\frac{1}{2}$ „ tea „ 1s. 5d. „ ;
13$\frac{1}{2}$ „ cheese „ 9$\frac{1}{2}$d. „ ;
4$\frac{3}{4}$ „ bacon „ 7d. „ ;
200 eggs at 16 for 1s.

15s. 9d. + 13s. 5$\frac{1}{2}$d. + 10s. 8$\frac{1}{4}$d. + 2s. 9$\frac{1}{4}$d. + 12s. 6d. = £2 15s. 2d. Ans.

3. If a 4d. loaf weigh 3 lbs. when wheat is 24s. per qr., what will it weigh when wheat is 32s. per qr.
2$\frac{1}{4}$ lbs. Ans.

4. What must be added to $\frac{7}{9}$ to make it $\frac{9}{10}$?
$\frac{11}{90}$. Ans.

1. Bill:—

15 books at 2s. 9d. each;
50 „ „ 1$\frac{1}{2}$d. „ ;
10 „ „ 4$\frac{1}{2}$d. „ ;
6 gals. „ 9$\frac{1}{2}$ per qt.;
200 envelopes at 10 for 2d.

£2 1s. 3d. + 6s. 3d. + 3s. 9d. + 19s. + 3s. 4d. = £3 13s. 7d. Ans.

2. Find the cost of 51 gals. 3 qts. at 18s. 9d. per gallon. £48 10s. 3$\frac{3}{4}$d. Ans.

3. A man cuts a drain 25 yds. 1 ft. in 5 hours. How long will he be in cutting a drain 16 yds. 2 ft. 8 in. long? 3$\frac{1}{3}$ hours Ans.

4. Take $\frac{1}{6}$ from the sum of $\frac{1}{10}$ and $\frac{1}{5}$. $\frac{2}{15}$. Ans.

STANDARD VI.

There were two different cards.

1. If I can walk 3$\frac{3}{4}$ miles in 1 hour, how many feet can I walk in a second? 5$\frac{1}{2}$ feet. Ans.

2. Add ·125 of 2s; ·075 of £1; 6·3125 of 1s.
8s. 0$\frac{3}{4}$d. Ans.

3. Simplify

$$\frac{\frac{1}{2}+\frac{1}{3}+\frac{1}{4}-\frac{1}{5}}{\frac{1}{3}+\frac{1}{4}+\frac{1}{5}-\frac{1}{6}}. \qquad 1\tfrac{16}{37}. \text{ Ans.}$$

4. A publican mixes 12 gallons at 9$\frac{1}{2}$d. per gallon, 8 gallons at 15d. per gallon, and 14 gallons at 7$\frac{1}{4}$d. per gallon. At what price must he sell it to neither gain nor lose? 9$\frac{59}{68}$d., or 9$\frac{3}{4}$d. $\frac{8}{17}$q. per gallon. Ans.

1. A goes 308 yards to B 284 yards in a minute. A gives B $\frac{1}{2}$ minute start. In what time will A overtake B? 5$\frac{11}{12}$ minutes. Ans.

2. ·04585 × ·062 ÷ 1·31. ·00217. Ans.

3. $\frac{1}{3}$ of 5s. + $\frac{7}{60}$ of £1 + $\frac{3}{37}$ of 6s. 2d. + $\frac{5}{39}$ of 4s. 10$\frac{1}{2}$d. 5s. 1$\frac{1}{2}$d. Ans.

4. If $\frac{7}{8}$ of a ton cost £22 15s., what will $\frac{12}{13}$ of 1 cwt. cost? £1 4s. Ans.

STANDARD VII.

There were two different cards.

1. If 60 houses, burning three fires each, consume 9 tons of coal in 20 days, how many houses, burning four fires each, will consume 18 tons in 18 days? 100 houses. Ans.

2. A man buys a horse, and sells it for £56, thereby gaining 33⅓ per cent. What did it cost him at first? £42. Ans.

3. Divide 1·791 by ·003, and multiply the result by ·001. ·597. Ans.

4. A man spends £2 5s. in oranges. He gives 1s. per score for them, and sells them for 1s. per dozen. What was his total gain? £1 10s. Ans.

1. If 9d. is gained on 12 yards of calico at 3¼d. per yard, what is the gain per cent.? $23\frac{1}{13}$ per cent. Ans.

2. If 20 men work 9 days of 10 hours each for £12 10s., how many hours per day must 60 men work to obtain £25 in five days? 12 hours. Ans.

3. What sum of money must be lent to obtain £160 10s. at 4 per cent. in three years? £1,337 10s. Ans.

4. A man got £35 interest on money at 3 per cent. and 4 per cent. How much did he lend, if he had equal amounts of money lent at 3 per cent. and 4 per cent.? £1,000. Ans.

Note.—The scholars in Standards III.—VII. were told by the Inspector that the problem was equal to two sums, and if they had that alone correctly worked they would pass.

Mental Arithmetic.

STANDARD I.

1. How many halfpenny tops can be had for 9½d.? 19. Ans.

2. How many for 3½d? 7. Ans.

3. How many farthings are there in 3½d.? 14. Ans.

4. Take 3½d. from one shilling. 8½d. Ans.

5. I gave 3 boys 7 marbles each. How many had I given away? 21. Ans.

6. How many more should I want to make 40? 19. Ans.

7. In 19 halfpence how many pence are there? 9½d. Ans.

8. How many half-crowns are there in 10 shillings? 4. Ans.

9. From 2 shillings take 1s. 3½d. 8½d. Ans.

10. If oranges are 3 a penny, how many could I get for 3d.? 9. Ans.

11. How many sixpences are there in 6 shillings? 12. Ans.

12. How many threepenny pieces are there in 6 shillings? 24. Ans.

STANDARD II.

The teacher questioned the class in the presence of the Inspector.

No questions were asked by the Inspector.

STANDARD III.

1. Find the cost of 7 lbs of sugar at 1½d. per lb. 10½d. Ans.

2. How much change would be received out of 2 shillings? 1s. 1½d. Ans.

3. If 2 lbs. of sugar cost 5d., find the cost of 1½ lbs.? 3¾d. Ans.

4. If I put down a sovereign, how many half-crowns could I get for it? 8. Ans.

5. How many feet are there in 13 yards? 39. Ans.

6. What is the cost of 39 yards at a halfpenny a yard? 1s. 7½d. Ans.

7. How many lbs are there in a stone? 14. Ans.

8. Find the cost of a stone of potatoes at 2d. a lb. 2s. 4d. Ans.

9. Find the cost at 2½d. a lb. 2s. 11d. Ans.

10. An article was bought for 3s. 9d.; what change was received out of half a sovereign? 6s. 3d. Ans.

11. Another cost 5s. 3d., what change was received out of a sovereign? 14s. 9d. Ans.

12. How many oranges at 4 a penny could you get for 1s. 0½d.? 50. Ans.

13. A boy sold 13 evening papers on Monday, 13 on Tuesday, and 13 on Wednesday. How much did he take for those papers at a halfpenny each? 1s. 7½d. Ans.

14. How many cwt. are there in a ton? 20. Ans.

15. A man bought a ton of coal for 10s., and sold it at 3d. per half cwt. How much did he gain? Nothing. Ans.

STANDARD IV.

1. What measure should I use in measuring the length of this room? Long measure. Ans.

2. What measure should I use for the breadth? Long measure. Ans.

3. If a square board contains a square yard, how many feet long would it be? 3 feet. Ans.

4. If I hold up a piece of carpet containing a square yard but 4 feet long, what is the breadth? 2¼ feet. Ans.

5. If a wall is 7 ft. long and 4 ft. broad, what is its area? 28 sq. feet. Ans.

6. Find the cost of whitewashing at 3d. per sq. ft. 7s. Ans.

7. A grocer buys ½ cwt. of sugar at 1½d. per lb., and sells it at 2d. a lb. What does he gain? 2s. 4d. Ans.

8. A man smokes ½ oz. of tobacco every day, how long will 3 lbs. last? 96 days. Ans.

9. A man buys eggs at 3 for 2d., and another buys them at 2 for 1½d. How many will one have more than the other for 1s.? 2. Ans.

10. What will be the difference for 5s.? 10. Ans.

Standard V.

1. If I give away ⅓ of anything, how many twelfths have I left? 8. Ans.

2. Find the difference between $\frac{1}{6}$ and $\frac{1}{8}$. $\frac{1}{24}$. Ans.

3. If I buy ½ cwt. of sugar at 1½d. per lb. and sell it at 2d., what do I gain? 2s. 4d. Ans.

4. If $\frac{2}{5}$ of my money amounts to half a crown, how much have I? 6s. 3d. Ans.

Standards VI. and VII.

1. Find the value of ·625 of £1. 12s. 6d. Ans.

2. Find the amount of £5 for one year at 5 per cent. £5 5s. Ans.

3. In what time will £973 18s. 5¾d. double itself at 10 per cent.? 10 years. Ans.

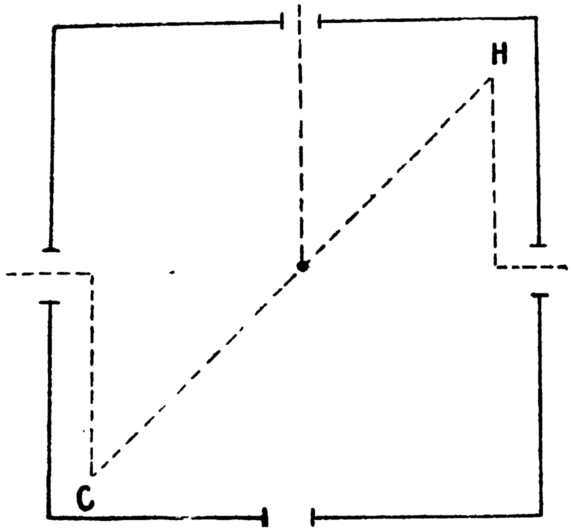
4. Take $\frac{1}{6}$ from $\frac{1}{5}$, and take the result from $\frac{5}{6}$. $\frac{4}{5}$. Ans.

Geography.

All taken orally, except Standard VII., who answered the questions on slates.

Standard I.

The teacher first questioned the class. The Inspector began by making the following diagram on the blackboard, and then asked questions upon it:—



The figure stands for a field, the dot for a boy, H for a horse, and C for a cow.

1. The boy goes to catch the horse; what direction does he go? North-east. Ans.

2. The horse runs down the field; what direction does it run? South. Ans.

3. It then turns through the gate; what direction does it take? East. Ans.

4. The boy then goes to the cow; what direction does he now take? South-west. Ans.

5. The cow runs to the gate on the left; what direction does it go? North. Ans.

6. It turns through the gate; what direction does it now take? West. Ans.

7. The boy then goes out of the top gate to go go home; what direction is that? North. Ans.

Plan of the School.

8. Show me which is the room we are in now.

9. Show me the new class room.

10. Show me, where I am standing, on the plan.

11. After telling two boys to go to various parts of the room, he asked other boys to show him on the plan where they were standing.

Map of the World.—12. Pointing to the map, the Inspector asked a boy to show him the sky.

13. He then pointed to the Atlantic Ocean, and said, what is this I am pointing to?

14. He next pointed to a river, and asked what it was.

15. He then pointed to a town, and asked what the dot stood for.

Standard II.

The teacher was asked by the Inspector to question the class from the blank map of England.

The Inspector then drew a diagram of a lake on the black-board.

1. What would a piece of water be called which I could walk round, if it was larger than a pond and smaller than a sea?

2. What would a piece of land be called which I could sail round in a boat? (Pointing to diagram of lake.)

3. What is this called which flows into the lake? (Drawing a river.)

4. What are these smaller rivers called which flow into the river. (Drawing tributaries.)

5. Give me another name besides tributary.

6. Suppose a town is situated at the junction of two rivers, what is that place called?

7. What do you call the sides of a river?

8. How are they distinguished?

9. Who has ever seen a river?

10. Name the river nearest the school.

11. Is your town on the right or left bank of this river?

12. Sometimes a river has more than one mouth. What is the land between two mouths called? (Showing on diagram.)

13. What should we find at the source of a river?

14. What is the source?

15. What is the end called?

16. What is a wide river mouth called up which the sea flows?

17. I could sail all round this piece of land. What is it called? (Drawing diagram of an island.)

18. If it had water all round, except at this place, what would it be? (Altering diagram.)

19. What is the land called which prevents it being an island?

20. If a passage was cut through the isthmus, what would it be called?

21. If the passage had always been there, what would it be called?
22. If the peninsula was water, and the isthmus water, what would the narrow opening be called?

Standard III.

The teacher first questioned the class.

The Inspector commenced with Yorkshire.

1. What is its great river?
2. Name the tributaries of the Ouse.
3. Give a town on the Aire.
4. Name a river running into the Aire.
5. What river must we cross to get into Durham?
6. Tell me any towns on it.
7. Name the chief city in Durham.
8. What is the principal building in the city of Durham?
9. On what river is it situated?
10. What is the large port at the mouth of the Wear?
11. What river must we now cross to get into the next county?
12. What is the name of the county?
13. Name a large town on the Tyne.
14. What hills do we cross on the west?
15. Into what county should we get?
16. What is it noted for?
17. Name some lakes.
18. We will come south. What county do we get into?
19. Which is larger, Lancashire or Yorkshire?
20. Which contains more people?
21. What is Lancashire noted for?
22. Name the largest town for this manufacture.
23. To what town would you go if you wished to see a large ship?
24. What river must we now cross?
25. Into what country would we arrive?
26. What is it noted for?
27. Name the salt towns.

Standard IV.

The Inspector told the teacher to question the class on Scotland.

The Inspector then asked the following questions:—

1. Suppose this blackboard to be a map of Ireland, which province would my hand be covering? (Placing his hand on the north.)
2. Which now? (Placing his hand on the W.)
3. „ „ ? („ „ „ S.W.)
4. „ „ ? („ „ „ E.)
5. What manufacture is carried on in the north?
6. What is the chief town?
7. Where would you go for the highest mountains?
8. What are they called?
9. Where would you go for the prettiest lakes?
10. What river should we find at Dublin?
11. What river is in the west?
12. What lakes does the Shannon form?
13. Name any other river forming a lake.
14. If we sail along the north coast, what opening should we come to?
15. What town should we arrive at?
16. How long since the siege of Londonderry?
17. Which is the largest lake?
18. Which is the prettiest lake?
19. In what county is it situated?
20. What curious feature is in the north?
21. What ocean is on the west of Ireland?
22. If we journey westward, what country should we come to?
23. What province do farmers go to?
24. What else could you do besides farming?
25. If we went to the far west, what province should we come to?
26. What river is in British Columbia?
27. What was the former capital?
28. What is the present capital?
29. What island is near to British Columbia?
30. What mountains are in British Columbia?
31. What falls are there in British Columbia, and where are they?
32. What mountains show that there are falls?

Standards V. and VI.

Europe.

The class was first questioned by the teacher. The Inspector asked the following questions:—

1. What is the capital of Russia?
2. What is the large river in Russia?
3. What sea does the Volga empty itself into?
4. What port is on the Volga?
5. What river rises in Switzerland and flows into France?
6. What river joins the Rhone?
7. What kind of a river is the Rhone?
8. Tell me the town at the junction of the Rhone and Saone.
9. What is Lyons noted for?
10. What river rises near the Rhone?
11. Where does the Rhine turn?
12. Tell me any other towns on the Rhine?
13. What would you go to the Rhine to see?
14. What other river in Europe has a very sharp bend?
15. Suppose I was drawing France on the board, what river should I put here? (Pointing to the west.)
16. What is that country called that would have disappeared if not looked after? (Holland.)
17. Where would it go to?
18. What do we get from Holland? (Toys.)
19. Is Russia east or west of Greenwich?
20. What time is it there now?
21. How many degrees can we travel east of Greenwich in Europe?
22. Where do we measure our longitude from?
23. What time will it be at the Ural mountains?
24. Suppose I went to Ireland, would my watch denote their time?
25. Which is the longest line of latitude?
26. How many degrees do we divide our earth into?
27. How many degrees can we go east of Greenwich?
28. How many degrees should we travel from the equator to the North Pole.

Standard VII.

1. Name the planets in their order of distance from the sun, and give a description of Jupiter.
2. Draw a diagram showing neap tide.
3. Write a description of the Atlantic Ocean, Arctic Ocean, Pacific Ocean, and the Gulf Stream.

4. Draw the shape of the moon when it is 7 days old.

The maps of France, Spain and Portugal, and Italy were given alternately to Standards V. to VII., and Standard VII. drew also astronomical diagrams.

Grammar.

All the Standards were taken orally.

STANDARD II.

The Inspector commenced thus:—I suppose you know all about nouns and verbs.

1. Can you tell whether the word 'rose' is a noun or verb?
2. What must you use beside to show what part of speech the word is?
3. Make a sentence with 'rose' as a noun.
4. Make a sentence with 'rose' as a verb.
5. 'I rose early this morning.' What part of speech is the word 'rose' there?
6. In 'I will come back to you,' which word is the noun?
7. Give a sentence with the word 'back' as a noun.
8. Give a sentence with the word 'back' as a verb.
9. Give other words which may be either nouns or verbs.
10. Give a sentence with the word 'bridge' as a noun.
11. Give a sentence with the word 'bridge' as a verb.
12. 'The woman was old, and ragged, and grey.' Give the noun and the verb.
13. 'And bent with the chill of the winter's day.' Give the nouns and the verb.

STANDARD III.

A piece of poetry was taken from one of the reading books.

The Inspector picked out some words, and asked for the parts of speech.

1. If a noun or verb the reason was required.
2. If an adjective what noun it belonged to.
3. If an adverb what verb it belonged to.
4. If a pronoun what noun it stood for.
5. They were asked to make sentences from words which might be nouns or verbs.
6. They were also asked to make sentences with words which might be adverbs or prepositions, as 'under.'
7. How are adverbs generally formed from adjectives?
8. Are all words ending in 'ly' adverbs?
9. Give a sentence containing an adjective ending in 'ly.'

STANDARD IV.

Only a fifth of the class was taken in this subject, some of the best being chosen and some of the worst.

Sentence:—'Oh call my brother back to me.'

1. What is the subject?
2. Parse 'Oh.'
3. Parse 'call.'
4. What is the rule for forming regular verbs?
5. Parse 'back.'
6. What is the case of 'my'?
7. Give the nominative of 'my.'
8. Give the objective of 'my.'
9. What person is 'my'?
10. Give the 2nd person of 'my.'
11. Give the 3rd person of 'my.'
12. Correct 'Me and him went to town.'
13. Correct 'Tom and me went a walk.'

Sentence:—'Across the field trotted the pony.'

14. What is the case of 'field'?
15. What is the number of 'pony'?
16. Parse 'across.'
17. What is a preposition?
18. What does 'across' do?
19. Give the subject of the sentence.
20. What is the past tense of 'go'?

STANDARD V.

One fourth of the class was taken in this subject.

Sentence:—

'Full many a gem of purest ray serene,
The dark unfathomed caves of ocean bear.'

1. Analyse the sentence.
2. Parse 'gem,' 'caves,' and 'bear.'
3. What is the case of 'ocean'?
4. Why is it objective?
5. What do prepositions do beside governing the objective case?
6. How can you tell an adverb?
7. Which word in the sentence is a participle?
8. What is a participle?
9. Give me any noun endings.
10. Give examples of nouns formed by them.
11. Form a noun from 'discuss.'
12. Tell me some adjective endings.
13. Give examples of adjectives formed by them.
14. In the sentence 'The woman had a good intellect,' what adjective can you use instead of 'good intellect'?

Sentence:—'There, the old man, his kind promise generously performed.'

15. Analyse the sentence.
16. Parse 'there,' 'man,' and 'performed.'
17. Why is 'generously' an adverb?

STANDARDS VI. and VII.

One half of these standards was taken in this subject.

Sentence:—'The winds that skirt the far-spreading forest, lull the spirit, while they fill the mind.'

1. Analyse the sentence.
2. Parse 'winds,' 'skirt,' 'lulls,' 'spirit,' and 'while.'
3. Why is 'that' a relative pronoun?

Sentence:—

'I think as pondering here I stand,
I see the rural beauties leave the land.'

4. Analyse the sentence.
5. Parse 'think,' 'pondering,' 'rural,' 'beauties,' and 'leave.'
6. How can you tell an adjective sentence?
7. How can you tell an adverbial sentence?
8. How can you tell a noun sentence?
9. How can you tell an adverb from a conjunction?
10. Is it proper to say 'Us are going'?
11. Is it proper to say 'He am gone'?
12. Give the prefixes with their meanings in the following words:—Sinecure, prefer, transport, immortal, semi-circle, extraordinary.
13. What is the meaning of the prefix 'preter'?

Recitation.

STANDARD I.

'The Voice of Spring.'

The Inspector called upon a boy to say the first verse, and then asked the following questions:—

1. Who is talking?
2. In what month does Spring begin?
3. How can Spring bring honey?
4. What does brief mean?

He then told another boy to say the second verse, and asked these questions:—

5. How does the bee hum?
6. Where are gnats when they are on the wing?

A boy then said the third verse.

7. What are catkins?
8. Why are primroses said to be star-like?
9. Was it snow on the white trees?

All the class said the last verse.

10. Was it a little or big oak tree that the rooks were in?

STANDARD II.

'Somebody's Mother.'

The Inspector called upon a boy to say the first four lines. The next six lines were said collectively. The best reciter in the class was asked to say the next ten lines. The remainder of the piece was said collectively. The Inspector questioned the class thoroughly on the recitation.

1. Tell me something about the old woman.
2. What is a ragged woman?
3. What is a grey woman?
4. What words in the poetry tell she had not sufficiect clothes?
5. What word tells that the snow had only fallen a short time before?
6. What does 'she pass unheeded' mean?
7. What does 'poorly clad' mean?
8. What does 'winter storm' mean?
9. Where did she stand?
10. Who stood with her?
11. What word tells she stood by herself?
12. Whom did she stand among?
13. Who has ever seen a human being?
14. How did the boys come?
15. What did they come like?
16. What does 'flock' mean?
17. What do you call a number of cattle?
18. What do you call a number of bees?
19. What do you call a number of lions?
20. What do you call a number of partridges?
21. Tell me something about the boy who helped the old woman across.
22. What did he tell his companions?
23. What did he say she was?
24. What did he hope about his own mother?
25. Who did he say the old woman was?
26. Who of you are somebody's sons?
27. What are the girls in the other school?
28. What is the lesson for us to learn from this story?
29. If you see a poor old woman should you laugh at her?
30. What should you do?
31. How should you always treat old people?
32. Whom did the old woman mention in her prayers that night?
33. Who did she say the boy was?
34. What do you mean by pride?

STANDARD III.

'The Slave's Dream.'

The Inspector called upon a boy to say the first verse; then upon the class to say the next verse; then npon another boy for the third verse; then upon the class, and so on alternately till the end of the piece.

1. Do you think the rice was cut?
2. Why do you think it was cut?
3. Why was his head buried in the sand?
4. What is a landscape?
5. What is meant by *lordly* Niger?
6. What was he before he was a slave?
7. What is a slave?
8. Where was his native land?
9. What do you know of a caravan?
10. Why did he cry?
11. Did he ride furiously?
12. What ocean did he think he saw?
13. What animals did he think he could hear?
14. What is a river-horse?
15. What do you mean by 'illumined'?
16. What is a fetter?

STANDARD IV.

'The Wives of Brixham.'

Ten boys were asked to say a verse each, and then the class finished it collectively.

1. What is meant by 'gentle water'?
2. What is meant by 'silently it floats'?
3. What is meant by 'sleepy boats'?
4. What water were the boats on?
5. What is meant by 'steal out'?
6. What is meant by 'summer is at hand'?
7. What is meant by 'the stormy taunts of winter'?
8. What do we mean by 'flying at its breast'?
9. What are 'merry boats'?
10. What do they search the seas for?
11. Are the cliffs made of silver?
12. What are they made of?
13. What light shone on their sails?
14. When does the year grow darker?
15. What toils do they ply at home?
16. What is meant by 'so it chanced'?
17. What were the men doing out at sea?
18. Were any men on shore?
19. How do you know?
20. What was it that taught the women to burn their beds?
21. What is meant by 'give us the men'?
22. What did they burn?
23. What was the precious food?
24. Why did they doubt?
25. Why did they struggle in?
26. What is meant by 'all that the sea would spare'?
27. What do we mean by 'this is what the men must do'?
28. What do we mean by 'this is what the women bear'?
29. Who work in the wind?
30. Who work in the foam?
31. Who watch for them at home?
32. What is meant by 'go out to meet the gales'?

Standards V.—VII.

'The Quarrel between Brutus and Cassius.'

About one-fourth of these standards was taken for the recitation. Only part of it was taken, and the pupils said it in turns.

1. What does it mean by 'friendly conference'?
2. Who were Brutus and Cassius?
3. Who stabbed Cæsar?
4. Where did he fall?
5. Who was Pompey?
6. Why were they in a tent?
7. Whom were they fighting against?
8. Who were Antony and Octavius?
9. Why did Brutus and Cassius quarrel?
10. What is the meaning of 'a hot friend cooling'?
11. What is the meaning of 'there are no tricks in plain and simple faith'?
12. Why did Brutus take part in the insurrection?
13. Why did not Cæsar like Cassius?
14. What did Antony say when he saw the body of Brutus?

Music.

Standards I. and II.

Exercise on Modulator:—

d m f s d m s d' t l d' m d' s m d'.

Song in two parts:—'Skies have lost their summer glow.'

Standards III. and IV.

Time test written on the blackboard:—

|l :— :— |l : :l |l :l.l: |l :l :l |

Note test written on the blackboard:—

d m f s d' ta l t d' s f s fe s r d.

Song in two parts:—'Evening is falling.'

Standards V.—VII.

Exercise on Modulator:—

d m s f l d' s m s d' fe s m ^{m}l, t, d s m d ^{d}s f m r d m l s d' f m r d.

Ear tests:—**d' s l s** and **d' t l s.**

Song in three parts:—'Merry laughing May.'

* * *

How my Drawing Examination was Conducted.

BY A

HEAD MASTER OF A LONDON BOARD SCHOOL.

Standard I.

The teacher was asked to draw the figure given below on the black board.

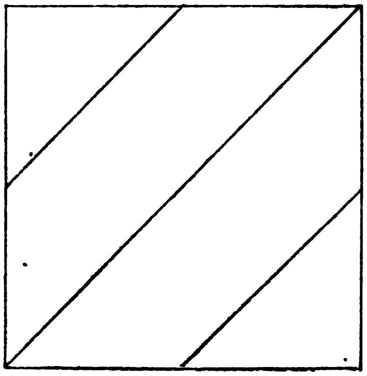
Then the children were told to divide their slates into two equal spaces by drawing a horizontal line.

In the upper space they had to copy the figure, using rulers and set squares, and making the sides of the figure three inches long.

Ten minutes were allowed for this.

The same figure was then drawn freehand, in the lower space.

When this had been done, the inspector passed around the class and examined the slates, and concluded the test by asking a few questions on the figure and the angles.



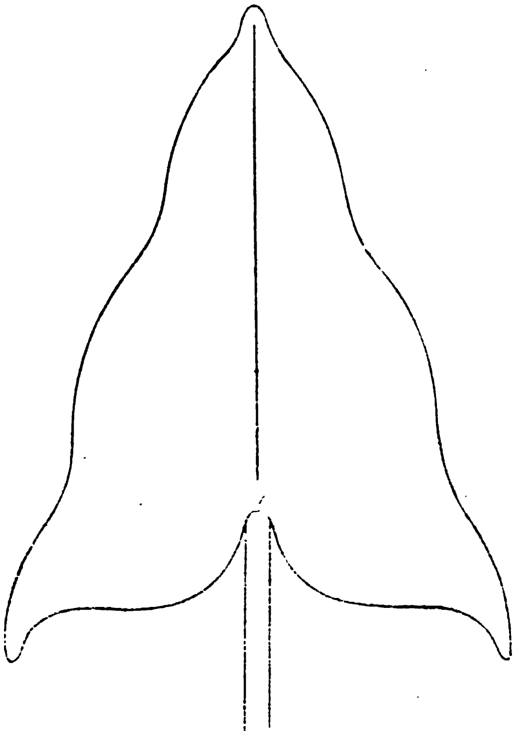
Standard II.

The same figure was given for Standard II., but it was drawn on paper.

Standard III.

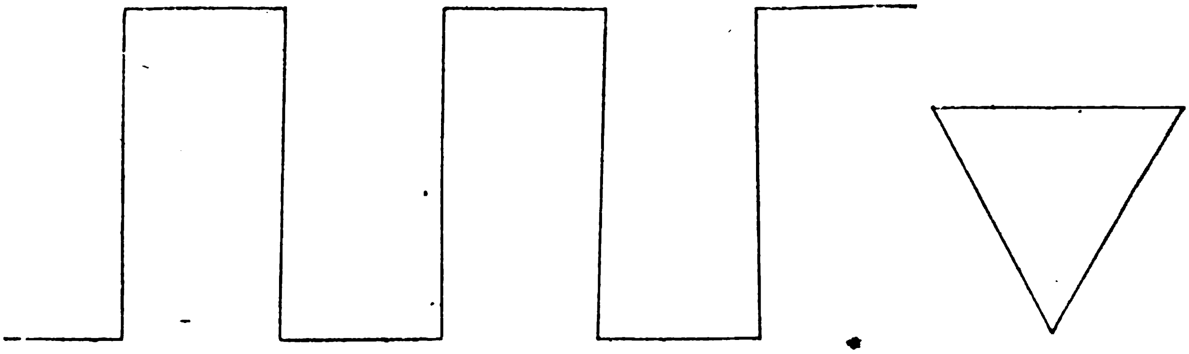
The teacher was allowed to divide the standard into two sections, one to take freehand, the other to copy geometrical figures with the aid of rulers and set squares.

Those taking *freehand* were allowed thirty minutes to draw the following copy so as to fairly fill the paper. This copy (about 18 by 12 inches) was pinned to the black board.

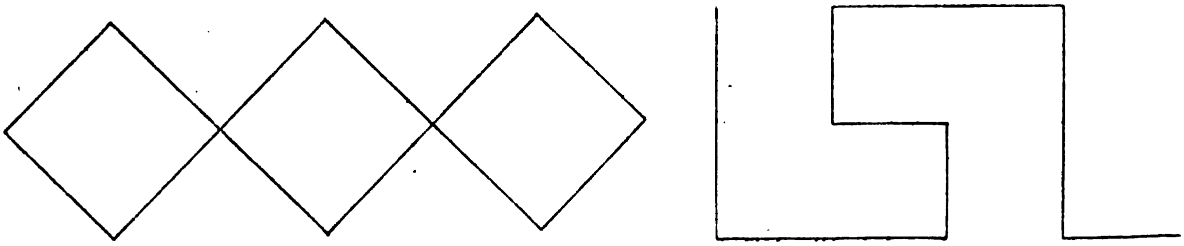


The Inspector distributed cards, each of which contained two figures, to the other section. The figures were to be copied 'a little larger.' The time allowed was thirty minutes. The copies given below are strictly accurate, and are exactly the same size as those set by the Department.

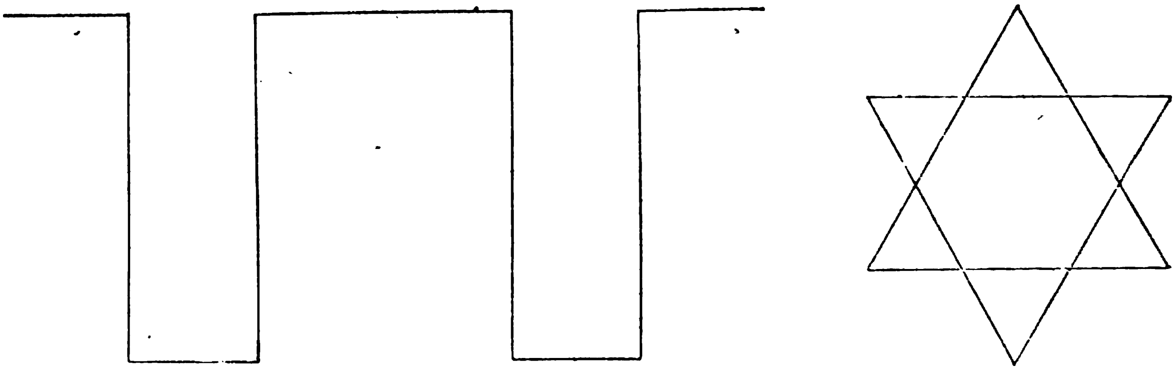
(First Card.)



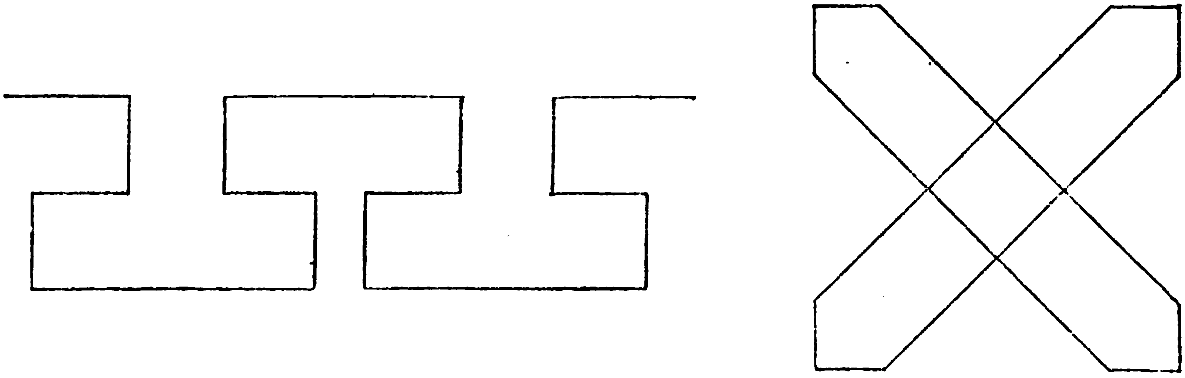
(Second Card.)



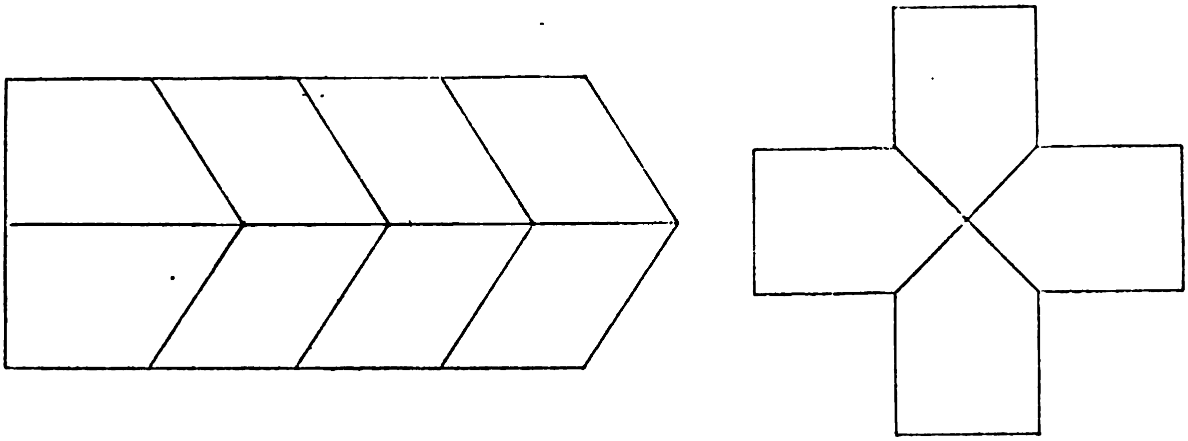
(Third Card.)



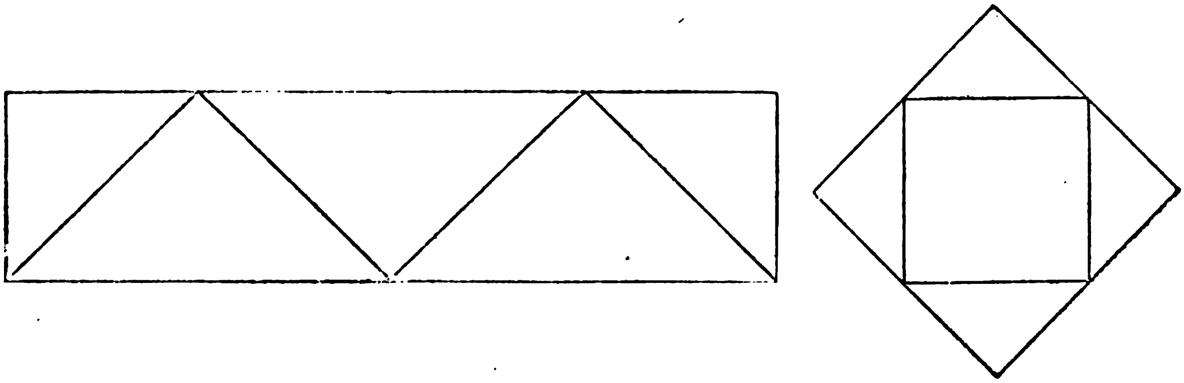
(Fourth Card.)



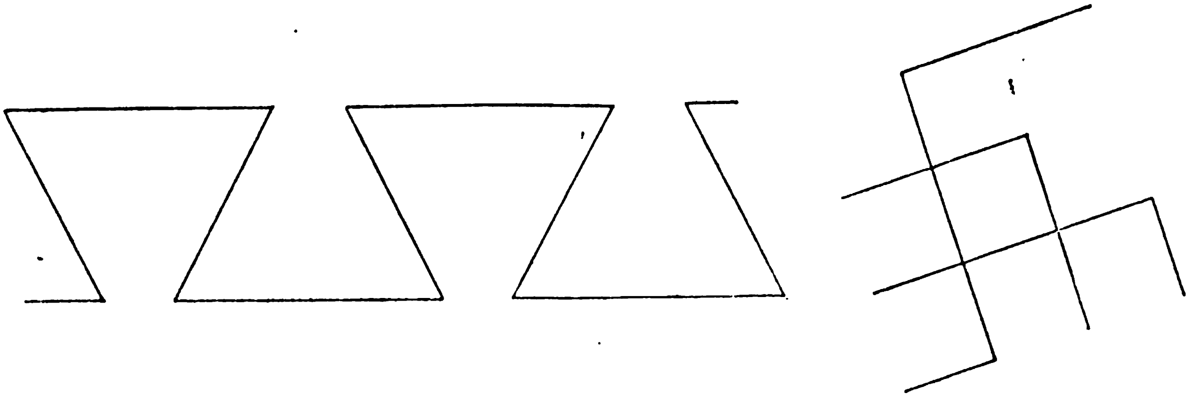
(Fifth Card.)



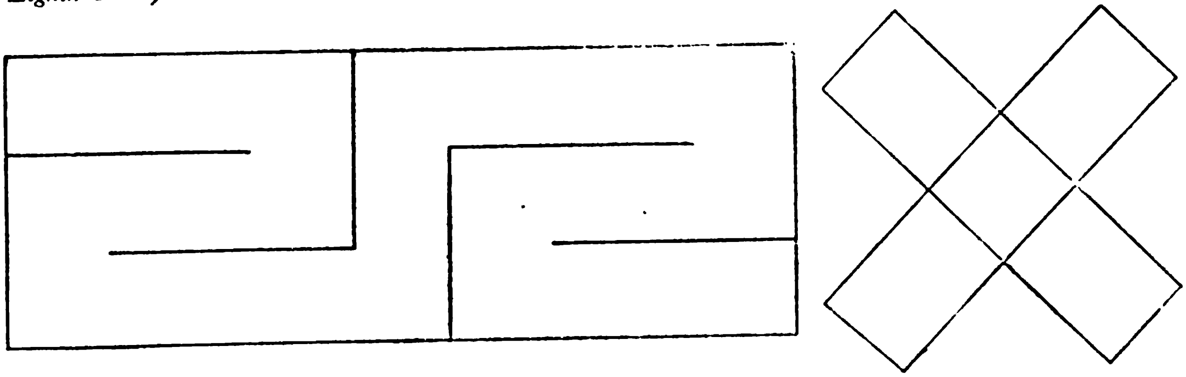
(Sixth Card.)



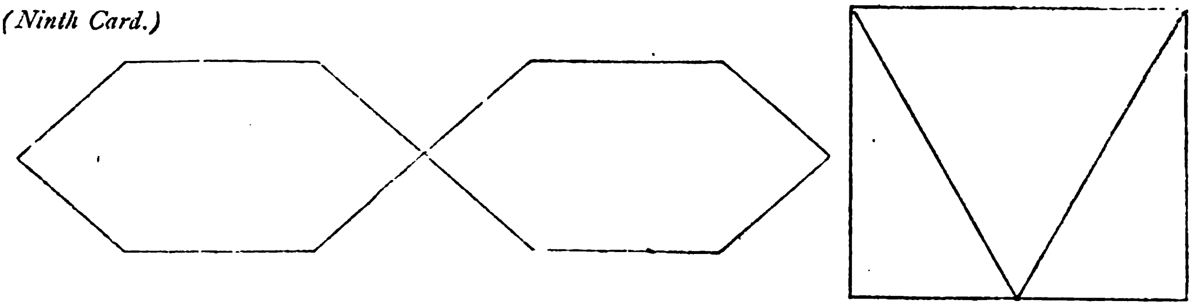
(Seventh Card.)



(Eighth Card.)



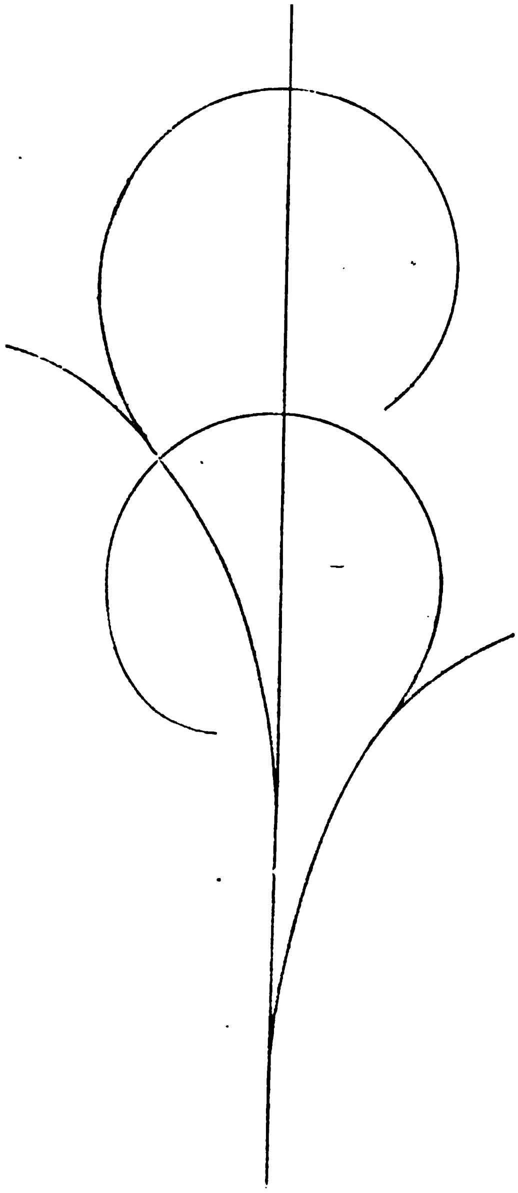
(Ninth Card.)



STANDARD IV.

All boys in this Standard were required to take two of the three tests—Freehand, Model, Drawing to Scale.

The following was the *freehand* copy:—



The exercise in *Model* consisted of

(1) A cube on the floor, in parallel position.

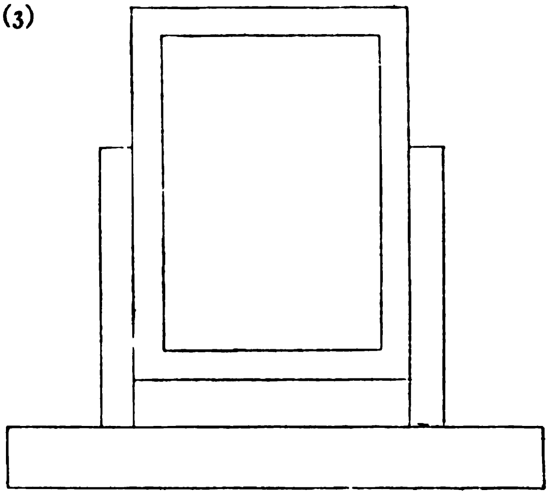
(2) A cone placed on its side, on the top of the cube.

Scale Drawing.—Some of the problems were—

(1) Draw a scale of 2 ft. 3 in. on a scale of 2 ins. to the foot.

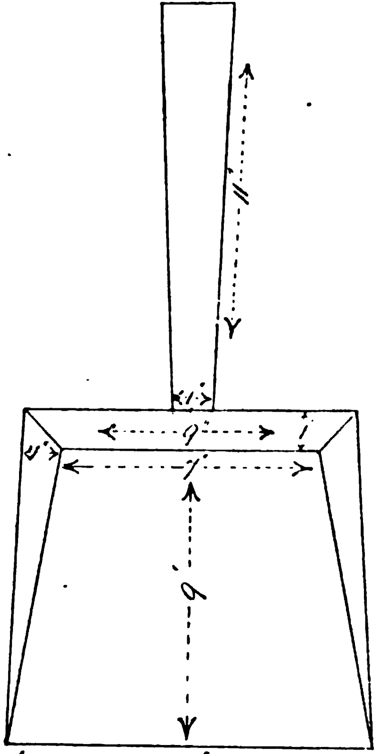
(2) Draw a scale of 3 ft. 6 ins. on the scale of $\frac{1}{2}$ in. to the foot.

(3)



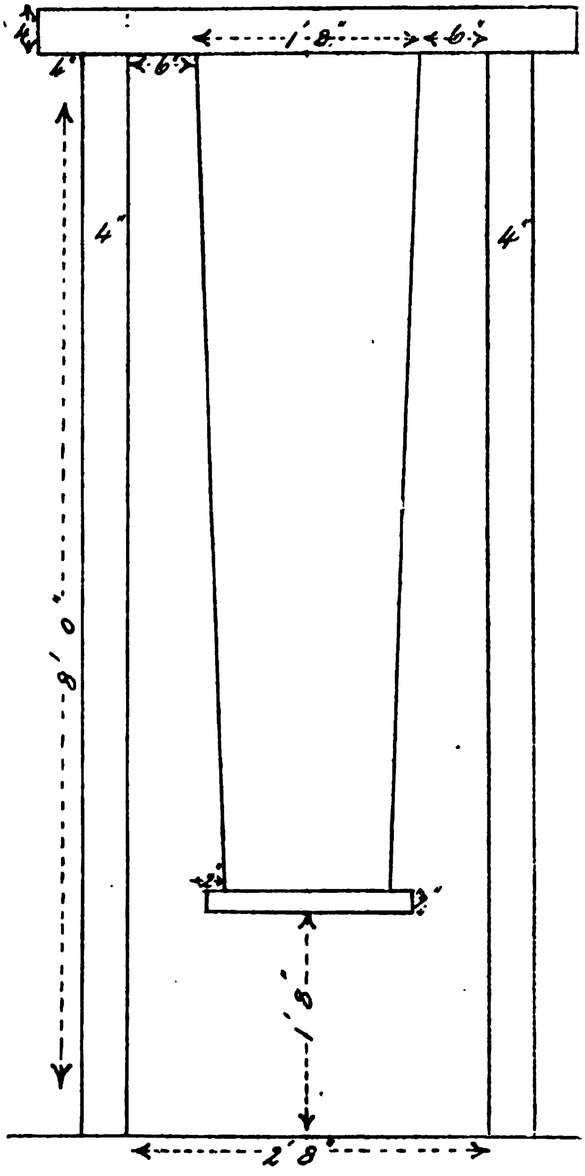
This is the front view of a looking-glass. Draw it twice the size.

(4)



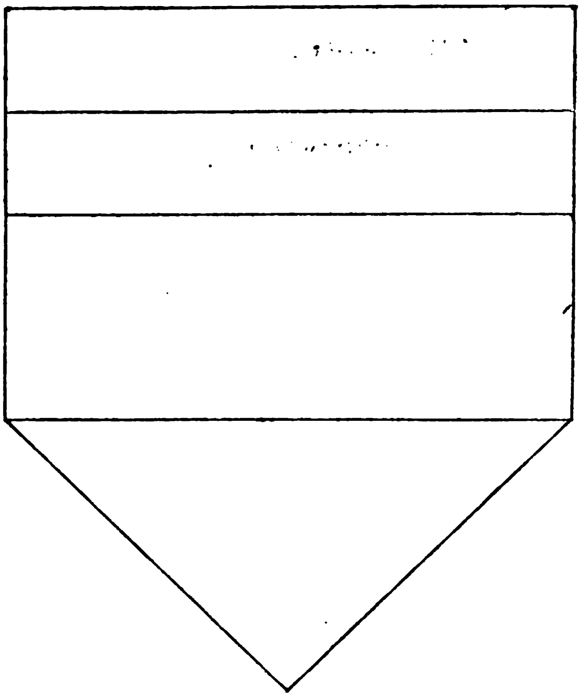
This is the front view of a shovel. Copy it on the squared paper, each square representing one inch.

(5)



The above represents a swing. Copy it on the squared paper. Each square represents two inches.

(6) Copy this figure three times the size (on plain paper).



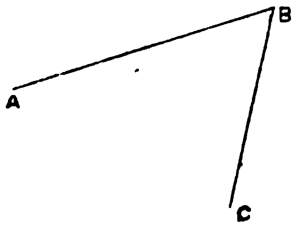
STANDARD V.

Model.—This test was the same as that given to Standard IV.

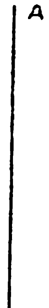
Geometry.—

(1) Draw a circle with a radius of one inch, and divide the circumference into four equal parts.

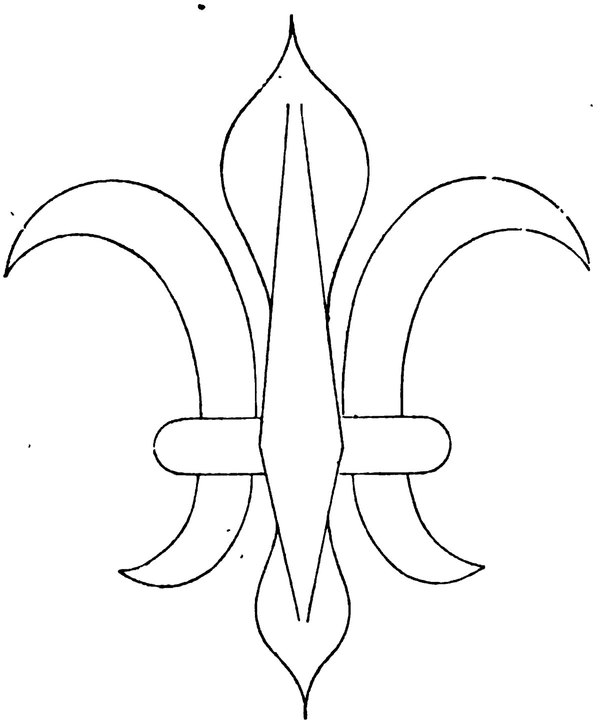
(2) Draw an angle half the size of the given angle ABC.



(3) On the given line AB construct an equilateral triangle.



Freehand.—This copy was pinned to the board.



How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music.

DIVISION III.—STANDARDS III. AND IV.

TIME REQUIREMENT—*continued.*

97. The systematic study of rests should now engage the attention of the class. Considered apart from notation whole pulse rests are easy to observe when they occur on *weak* pulses, and when the instructions are perfectly clear. Thus, if a teacher says 'sing *laa* to my down beats and be silent at my up beats,' the task is clearly indicated, and is easy to perform. But when rests on strong pulses are asked for it is found that the swing of the rhythm established strongly tempts pupils to make mistakes. The *sight-singing* requirements of the Code are therefore again lenient, in that they test rests only on the weaker accents.

98. The training of the eye to obedience to the notation of rests is a special study. Rests on strong pulses are, of course, as easy to read as rests upon weak pulses The difficulty, however, in teaching is to get pupils to *see* and think about rests. The tendency of the eye is to glance from the *last note* sung to the *next note* to be sung and to ignore the empty pulse or pulses between. This is why time names for rests are so useful. To the inexperienced it may seem a disadvantage to have time names for rests inasmuch as their use may foster the habit of singing in the rests. But in practice this is not found to be the case.

99. For the practice of rests apart from notation such exercises as the following are suggested: Teacher says (1) I will beat four pulses. Sing *laa* or TAA to each beat. (2) Now sing in the first three beats, and rest on the fourth. (3) Sing in the first and second, rest in the third and fourth. (4) Sing in one, rest in one, sing in two. (5) Sing in one, rest in two, sing in one, &c. Then ear exercises should form part of the lesson; the teacher beating and singing varies the position of a rest in a set of pulses, and invites pupils to say where it came.

100. As obedience to an order cannot be expected if the order is not understood, the notation of rests must be made abundantly clear. For the purpose of training the eye to observe empty pulses the following should be boldly written on the blackboard:—

| : | : | : | : ||

and attention should be drawn to the fact that the pulses are empty. The teacher now promises to put notes in some pulses and fills in, say as follows:—

|1 : |1 : | : | :1 ||

and pupils, in turn, are asked to come forward and point out the pulses that still remain empty. It is perhaps superfluous to remark that it is infinitely better for a pupil to pick out the empty pulses than for the teacher to do so. The whole class will almost certainly watch with interest the act of their fellow pupil; whereas the teacher's explanation will probably be received with serene opacity.

101. The next step is to make clear that the time name for an empty pulse is SAA. When this is established the following processes should be gone through with the exercises suggested below.

Plan of studying Rests.

1. Every pulse to be named as TAA, AA, or SAA.
2. Teacher alone to name the SAAS, the class to name filled pulses.
3. The foregoing reversed, the class naming the SAAS.
4. The teacher to undertake to clap or tap at the empty pulses, the class resting.
5. The foregoing reversed.
6. The teacher to make a silent beat at the empty pulses.

Specimen Exercises on weak pulse Rests.

(1) Four pulse measure.

|m :m |r :d |s :f |m : }
|r : |f : |m :r |d :— |

(2) With half pulses.

|s :s .f |m :s |d : |r : }
|m : |r : |m .f :m .r |d :— |

(3) Beginning on a weak pulse.
(Secondary measure.)

{ :m |d :s |m : |s :f .m |r }
{ : |d : |r : |d :t_1 |d

(4) Three pulse measure.

|s :l :s |s :f : |f :m : }
|m :r : |d : : |d :— :— |

(5)

|m :m :r |d .m :s : |s .f :m : }
|m .r :d : |d : :t_1 |d :— :— |

(6) (Secondary measure.)

{ :d |m :— :r |d : :d |s .l :s .f }
{ :m.r |d : : |t_1 : :t_1 |d :

The foregoing are written in tune. In copying them on a blackboard it will be found best to use 'l' throughout while the time names for rests are being studied. If beginners apply the names too soon to time and tune exercises the s (soh) suggests *saa* and confuses them.

102. Rests on strong pulses should be practised, although they are beyond the Code requirement. The methods of practice described in Sect. 101 are equally applicable to all rests.

Specimen Exercises on Strong pulse rests.

(1)

| s :— | m : | :s | f .m :r }

| m :r | :d | r :t, | d :— |

(2)

| m :— | r :d | :d | r :m }

| :f | m :r | :d | t, :d

(3)

| m :— :f | s :— :— | :f :m }

| :m :r | :r :d | s :t, :d ||

103. Pulse-and-a-half notes, with their almost invariable connection with a half-pulse note | $\overset{1\frac{1}{2}}{\text{l}}$:- $\overset{\frac{1}{2}}{.\text{l}}$ || should also be practised by the Division although they are not tested until Division IV. No rhythmic effect taught in an elementary course is so difficult to teach thoroughly as this. The tendency to disconnect the continuation from the struck note must be checked in the early stages of practice, and frequent patterns to time names and to laa should illustrate the smooth, unbroken connection of the two pulses. The first step is to get little phrases imitated after a pattern from the teacher.

Exercises on -AATAI for imitation. To be patterned by the Teacher.

(1) | m :- .r | d :— || (2) s :s | s :- .f | m :— ||

(3) | l :- .t | d' :— || (4) r :- .m | f :m || (5) m :- .f }

| s :d' || (6) m :f | m :- .r | d :— ||

The notation is best taught by altering a pulse divided into halves. Thus, having written the following :—

(7) | l :$\overset{*}{\text{l}}$ .l | l :— | l :$\overset{*}{\text{l}}$ .l | l :— ||

the teacher, promising to make two notes into pulse-and-a-half notes, rubs out the *laas* at * and substitutes a continuation mark, thus :

(8) | l :- .l | l :— | l :- .l | l :— ||

If a pupil can now be got to restore the *laas* rubbed out, and another pupil to rub out and substitute continuation marks, the notation will be fairly before the mind of the class.

The formation of the time name -AA TAI from TAATAI by omitting the consonant T from the latter must now be explained. But the teacher must be careful from the first not to freely use the word -AATAI disconnected from a previously struck pulse. It is better to speak of the two pulses together and say TAA -AATAI. The exercises given below should then be practised in the various ways now to be described.

Plan of studying pulse-and-a-half notes.

(TAA -AATAI)

1. Sing to the time names on a monotone. Insist upon the connection TAA -AATAI (not TAA, pause, -AATAI).

2. Sing to *koo* or *laa* on a monotone. Get a clear decided attack of each note, especially when *laa* is used.

3. *Say* the sol-fa syllables on a monotone in time. See that the vowels in continuations are smoothly sustained. Thus—

| s :- .l | m :— ||
so - - oh lah me - ee

not thus

| s :- .l | m :— ||
so * oh lah me * ee

with pauses at *

4. Sing in tune and time after each measure or phrase has been patterned.

5. Sing in tune and time without pattern.

Specimen exercises for the study of | l :- .l |
TAA -AATAI

(1)

| s :- .l s .f :m | f :- .m | m .r :d }

| r :- .m | f :m | r :- .m | d :— ||

(2)

| m :s .f | m :- .r d .r :m .f | s :m }

s :- .l | s :d | m :- .r | r :d |

(3)

{ :m | f :- .m :r | s :m :d }

| m :- .r :d | r :m :f | s :- .l :s }

| d' :s :m f :- .m :r | d :— :— ||

(4)

| m :m :m | s :- .f :m | r :m :f | l :s :s }

| fe :s :l | s :- .f :m r.m :f :t, | r :d : ||

(5)

| d :— | r :— m :- .f | s :m | d' :— | ta :— }

l :- .t | d' :s | s :— | fe :— s :- .m | d :r }

| m :m | r :- .d | d :— | — :—

104. When **fe** and **ta** can be sung with the easy surroundings described in sections 90 and 91 they should be approached by leap, and in another set of exercises quitted by leap. A study of the mental effects of **fe** and **ta** will greatly assist the somewhat difficult task of learning to leap to these tones. **fe** is bright and cheerful, and acts as a pointer to **soh**. **ta** is grave and cheerless, and acts as a pointer to **lah**.

fe by leap.

(1) **d s m d l fe s f m s d r d**
(2) **m d s m r fe s f l s m r d**
(3) **s d r f m d fe s l s f r d**

Each of the above should be sung successively in various keys (the *doh* chord in each being first clearly established). Say in this order, Keys D, F, C, E, G, D.

(4) **d s m d' fe s l s t$_1$ d**
(5) **m s d' f m fe s l fe s f r d**
(6) **s m d d' t fe s l r m f t$_1$ d**

In, say, keys C, E and D.

105. A good method of practising **fe** is for the teacher to sing or play a doh chord and to ask for **fe s**. This should be repeated again and again *each time in a new key*. This will be found to be a severe method of testing acquaintance with the peculiar effect of **fe**. It should be applied only to a class with good ability.

106. Leaps to **ta** are much more difficult than leaps to **fe**. They must be practised with great caution. The connection of **ta** with **lah** must be liberally shown. A tendency to sing too low for **ta** and then to slide up, or, worse still, nearly up to the right sound must be watched and corrected.

ta by leap.

(1) **d s f m d' s ta l t d' m s s d**
(2) **s m d m s ta ta l s t d' m r d**
(3) **m r d d' m f ta l t d' m s t$_1$ d**
(4) **s d m r d d' m ta l s f m s d**

Each of the above should be practised in, say, keys C, E, D.

Low **ta** by leap.

(5) **d s$_1$ m r d s$_1$ ta$_1$ l$_1$ t$_1$ d r t$_1$ d**
(6) **d s$_1$ l$_1$ ta$_1$ l$_1$ t$_1$ d s$_1$ d s$_1$ f$_1$ ta$_1$ l$_1$ t$_1$ d**
(7) **d t$_1$ d s$_1$ ta$_1$ l$_1$ s$_1$ t$_1$ d m r ta$_1$ l$_1$ s$_1$ d**

In keys D, G, E, A.

107. The method of practice described in section 105 above is, of course, equally applicable to **ta** as to **fe**. The teacher should at first end the doh chord with the high **doh**, the class to find **ta l**. Then the doh chord should end upon **soh**, **me** or the unmarked **doh**. The usefulness of this exercise depends upon the frequency of the change of key.

(*To be continued.*)

Query Column.

RULES.

1. Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

*** All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.*

Arithmetic.

1. C. F. C.—Find the fifth root of 344,730,881,243. (*University of Durham, 1st Year Honours*, Oct., 1888.)

```
 2                                                  | 34'47308'81243(203.   Ans.
 2                                                  | 32
 —           4                                      | ——————
 4 × 2       8                                      |  247308
 2           —             8                        |
 —          12 × 2        24                        |
 6 × 2      12             —                16      |
 2           —            32 × 2            64      |
 —          24 × 2        48                 —      |
 8 × 2      16             —                80      |
 2           —            80                        |
 —          40                                      |
10                                                  |
————————————————————————————————————————————————————|——————————————
100         4,000         80,000        800,000     | 24730831243
————————————————————————————————————————————————————|
1,000                                               |
    3                                               |
—————       400,000                                 |
1,003 × 3     3,009                                 |
            ———————       80,000,000                |
            403,009 × 3    1,209,027                |
                          ——————————  8,000,000,000 |
                          81,209,027 × 3  243,627,281 |
                                      ————————————— |
                                      8,243,627,281 | 24730881243
```

Note.—See Rule 1, at the head of the Query Column.

2. CYCLOPS.—Divide the cube of 1·236068 by 2·36068 correctly to five places of decimals. (*London University Matriculation*, Jan., 1886)

Contracted multiplication to six places of decimals:—

$$\begin{array}{r}
1{\cdot}236068 \\
\underline{8606321} \\
1236068 \\
247214 \\
37082 \\
7416 \\
74 \\
\underline{10} \\
1{\cdot}527864 \\
\underline{8606321} \\
1527864 \\
305573 \\
45836 \\
9167 \\
91 \\
\underline{12} \\
\underline{\underline{1{\cdot}888543}}
\end{array}$$

$$\begin{array}{r}
2{\cdot}36068)1{\cdot}888543(\cdot 7 \\
\underline{1652476} \\
\underline{\underline{236067}}
\end{array}$$

The answer correct to five places of decimals is evidently ·79999. This will be found so by actual division.

3. H.B.—A sum of £1,640 is borrowed to be paid back in two years by two equal annual payments, allowing 5 per cent. compound interest. Find the annual payment. (*Hall and Knight.*)

$$\overset{£}{\underset{21}{\cancel{105}}} : \overset{£}{\underset{20}{\cancel{100}}} :: \overset{£}{100} : \text{Debt for a payment of £100 the first year.}$$

$$= £\tfrac{2000}{21}.$$

$$\overset{£}{110\tfrac{1}{4}} : \overset{£}{100} :: \overset{£}{100} : \text{Debt for a payment of £100 the second year.}$$

$$= £\tfrac{40000}{441}.$$

Amount of debt for two annual payments of £100

$$= \left(\tfrac{2000}{21} + \tfrac{40000}{441}\right)£$$

$$= \frac{42000 + 40000}{441}£$$

$$= \tfrac{82000}{441}£.$$

$$\therefore \overset{£}{\tfrac{82000}{441}} : \overset{£}{1,640} :: \overset{£}{100} : \text{Annual payment.}$$

$$= \frac{\overset{2}{\cancel{1640}} \times \cancel{100} \times 441}{\cancel{82000}}£$$

$$= \underline{£882}.\ \text{Ans.}$$

Note.—(1) The following example will show the method:—

$$\begin{array}{r}
526 \\
\underline{78} \\
4208 \\
\underline{3682} \\
\underline{\underline{41028}}
\end{array}$$

Remainder in multiplicand after casting out nines

$= 5 + 2 + 6$
$= 13$
$= 4;$

Remainder in multiplier after casting out nines

$= 7 + 8$
$= 15$
$= 6;$

4 multiplied by 6 $= 24$
$= 6$ remainder;

Remainder in product after casting out nines

$= 4 + 1 + 2 + 8$
$= 15$
$= 6.$

If an error of 9, or any of its multiples, be committed, the results will nevertheless agree, and so the error in that case remains undetected.

Mensuration.

1. RHONDDA JACK.—Regular hexagons are inscribed in circles whose radii are 3 ft. and 5 ft. What is the area of the circle in which the area of the inscribed hexagon is a mean proportional between the areas of the two former hexagons? ($\pi = \frac{22}{7}$.) (*Pupil Teachers' April Examination*, 1887.)

The hexagons contain six equilateral triangles, the sides of which are equal to the radii of the circumscribed circles.

Area of equilateral triangle $= \frac{1}{2}$ (side × perpendicular)

$$= \tfrac{1}{2}\left(\text{side} \times \sqrt{\text{side}^2 - \frac{\text{side}^2}{4}}\right)$$

$$= \tfrac{1}{2}\left(\text{side} \times \frac{\sqrt{3}}{2}\text{side}\right)$$

$$= \frac{\sqrt{3}}{4}\text{side}^2;$$

$$\therefore \text{Area of first hexagon} = \left(\frac{\sqrt{3}}{4} \times 3^2 \times 6\right)\text{sq. ft.,}$$

$$\text{,, second ,,} = \left(\frac{\sqrt{3}}{4} \times 5^2 \times 6\right)\text{sq. ft.;}$$

Mean proportional between these two areas

$$= \left[\sqrt{\left(\frac{\sqrt{3}}{4} \times 3^2 \times 6 \times \frac{\sqrt{3}}{4} \times 5^2 \times 6\right)}\right]\text{sq. ft.}$$

$$= \left(\frac{\sqrt{3}}{4} \times 3 \times 5 \times 6\right)\text{sq. ft.}$$

Area of each of the equilateral triangles of third hexagon

$$= \left(\frac{\sqrt{3}}{4} \times 15\right)\text{sq. ft.}$$

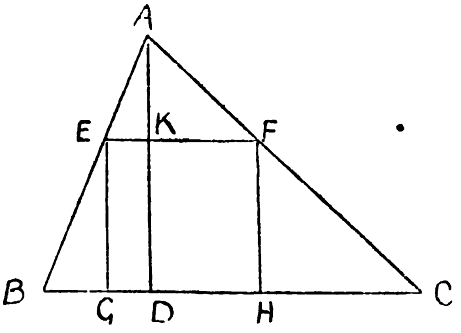
$$\therefore \left(\frac{\sqrt{3}}{4} \times 15\right)\text{sq. ft.} = \frac{\sqrt{3}}{4}(\text{side of triangle})^2$$

$$\begin{aligned}
\therefore\ (\text{Side of triangle})^2 &= 15 \text{ sq. ft.} \\
(\text{Radius of required circle})^2 &= 15 \text{ sq. ft.} \\
\therefore\ \text{Area of the circle} &= \text{radius}^2 \times \tfrac{22}{7} \\
&= 15 \text{ sq. ft.} \times \tfrac{22}{7} \\
&= \tfrac{330}{7} \text{ sq. ft.} \\
&= \underline{47\tfrac{1}{7} \text{ sq. ft.}}\ \text{Ans.}
\end{aligned}$$

2. HOOD.—ABC is a triangle. A square is described with two angular points on BC, and one angular point on each of the sides CA and CB.

If a = side BC,
r = perpendicular from A to BC,
and v = side of square,
prove $ar = v(a + r)$.

(*Wrigley's* 'Elementary Trigonometry.')



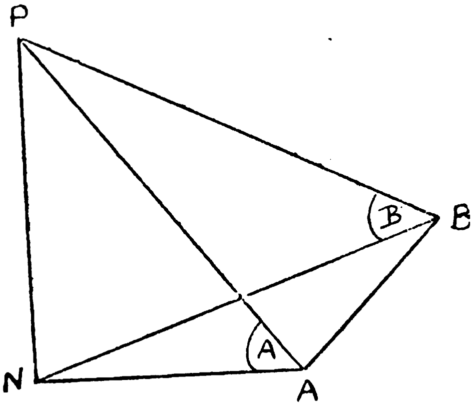
$$\frac{\text{BC} \times \text{AD}}{2} = \frac{\text{BG} \times \text{EG}}{2} + \text{GH}^2 + \frac{\text{CH} \times \text{FH}}{2} + \frac{\text{EF} \times \text{AK}}{2},$$

$$\begin{aligned}
\therefore ar &= \text{BG} \times v + 2v^2 + \text{CH} \times v + v(r - v) \\
&= v(a - v - \text{CH}) + 2v^2 + v.\text{CH} + vr - v^2 \\
&= av - v^2 - v.\text{CH} + v^2 + v.\text{CH} + vr \\
&= av + vr \\
&= v(a + r).
\end{aligned}$$

Trigonometry.

1. MATHEMATICUS.—A flagstaff PN stands on horizontal ground, and a base AB is measured at right angles to AN (A, B, N being points on the ground). The angles PAN and PBN are observed and denoted by A and B; prove that height of the flagstaff is

$$\frac{AB \sin A \sin B}{\sqrt{[\sin (A + B) \sin (A - B)]}}.$$



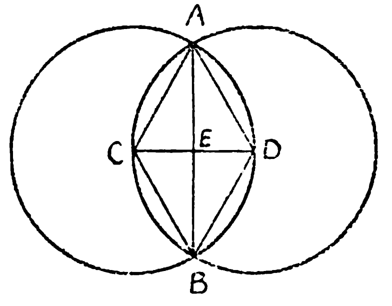
$$NB = PN \cot B,$$
$$NA = PN \cot A;$$
$$NB^2 - NA^2 = AB^2,$$
$$PN^2 (\cot^2 B - \cot^2 A) = AB^2,$$
$$\therefore PN = \frac{AB}{\sqrt{\cot^2 B - \cot^2 A}}$$
$$= \frac{AB}{\sqrt{(\cot B + \cot A) (\cot B - \cot A)}},$$

$$\text{But, } \cot B \pm \cot A = \frac{\cos B}{\sin B} \pm \frac{\cos A}{\sin A}$$
$$= \frac{\sin A \cos B \pm \sin B \cos A}{\sin A \sin B}$$
$$= \frac{\sin (A \pm B)}{\sin A \sin B};$$
$$\therefore PN = \frac{AB \sin A \sin B}{\sqrt{[\sin (A + B) \sin (A - B)]}}.$$

Note.—The student should notice the following formulæ:—

$$(1)\ \tan A \pm \tan B = \frac{\sin (A \pm B)}{\cos A \cos B}.$$
$$(2)\ \cot B \pm \cot A = \frac{\sin (A \pm B)}{\sin A \sin B}.$$
$$(3)\ \cot A \pm \tan B = \frac{\cos (A \mp B)}{\sin A \cos B}.$$
$$(4)\ \cot B \pm \tan A = \frac{(\cos A \mp B)}{\cos A \sin B}.$$

2. SAMBO.—Two equal circles are drawn with the centre of one on the circumference of the other; find the ratio of the areas of the parts into which one of the circles is divided. (*Willis'* 'Trigonometrical Exercises.')



Let a = radius of circles.

Triangles ACD, BCD are equilateral,

$$\therefore \text{Angle ACB} = 120^\circ;$$

$$\text{Area of sector ABC} = \frac{120^\circ}{360^\circ} \text{ of area of circle}$$
$$= \tfrac{1}{3} \text{ of area of circle}$$
$$= \tfrac{1}{3} a^2 \pi, \ (\text{let } \pi = \tfrac{22}{7})$$
$$= \frac{22a^2}{21};$$

$$\text{Area of triangle ABC} = CE \times AE$$
$$= \frac{a}{2} \times \sqrt{a^2 - \left(\frac{a}{2}\right)^2}$$
$$= \frac{a}{2} \times \frac{a\sqrt{3}}{2}$$
$$= \frac{a^2\sqrt{3}}{4};$$

$$\text{Area of segment ADB} = \frac{22a^2}{21} - \frac{a^2\sqrt{3}}{4}$$
$$= \frac{a^2 (88 - 21\sqrt{3})}{84};$$

$$\therefore \text{Area of figure ADBC} = \frac{a^2 (88 - 21\sqrt{3})}{84} \times 2$$
$$= \frac{a^2 (88 - 21\sqrt{3})}{42};$$

$\therefore$ Ratio of the areas of the parts into which one of the circles is divided

$$= \frac{a^2 (88 - 21\sqrt{3})}{42} : \frac{22a^2}{7} - \frac{a^2 (88 - 21\sqrt{3})}{42}$$
$$= \frac{88 - 21\sqrt{3}}{42} : \frac{132 - 88 + 21\sqrt{3}}{42}$$
$$= 88 - 21\sqrt{3} : 44 + 21\sqrt{3}. \quad \text{Ans.}$$

3. W. J. H. P.—Eliminate θ and ϕ from the equations:—

$$\left.\begin{aligned} a \sin \theta &= b \sin \phi \\ c &= a \cos \theta + b \cos \phi \\ x &= y \tan (\theta + \phi) \end{aligned}\right\}.$$

$$\left.\begin{aligned} &(1)\ a \sin \theta = b \sin \phi \\ &(2)\quad c = a \cos \theta + b \cos \phi \\ &(3)\quad x = y \tan (\theta + \phi) \end{aligned}\right\}$$

$$\left.\begin{aligned} &(1)\ a \sin \theta - b \sin \phi = 0 \\ &(2)\ a \cos \theta + b \cos \phi = c \end{aligned}\right\}$$

Squaring]

$$\left.\begin{aligned} &(1)\ a^2 \sin^2 \theta - 2ab \sin \theta \sin \phi + b^2 \sin^2 \phi = 0 \\ &(2)\ a^2 \cos^2 \theta + 2ab \cos \theta \cos \phi + b^2 \cos^2 \phi = c^2 \end{aligned}\right\}$$

Adding] $a^2 (\sin^2 \theta + \cos^2 \theta) + 2ab (\cos \theta \cos \phi - \sin \theta \sin \phi) + b^2 (\sin^2 \phi + \cos^2 \phi) = c^2$

$$\therefore a^2 + 2ab \cos (\theta + \phi) + b^2 = c^2$$
$$2ab \cos (\theta + \phi) = c^2 - a^2 - b^2$$
$$\therefore \cos (\theta + \phi) = \frac{c^2 - a^2 - b^2}{2ab}.$$

$$\text{Sin} (\theta + \phi) = \sqrt{[1 - \cos^2 (\theta + \phi)]}$$
$$= \sqrt{\left\{1 - \left(\frac{c^2 - a^2 - b^2}{2ab}\right)^2\right\}}$$
$$= \frac{\sqrt{4a^2b^2 - (c^2 - a^2 - b^2)^2}}{2ab}.$$

$$(3)\ \frac{x}{y} = \tan (\theta + \phi)$$
$$= \frac{\sin (\theta + \phi)}{\cos (\theta + \phi)}$$
$$= \frac{\sqrt{4a^2b^2 - (c^2 - a^2 - b^2)^2}}{c^2 - a^2 - b^2}$$
$$\text{or } \frac{\sqrt{2a^2b^2 + 2a^2c^2 + 2b^2c^2 - a^4 - b^4 - c^4}}{c^2 - a^2 - b^2}.$$

4. ARTHUR THORNTON.—Prove—

$$\log \sin^2 (x + iy) = \log (e^{2y} - 2 \cos 2x + e^{-2y})$$
$$- \log 4 + 2i \tan^{-1} \cot x \frac{e^y - e^{-y}}{e^y + e^{-y}}.$$

(*Lock's* 'Higher Trigonometry.')

$$\text{Sin } (x + iy) = \sin x \cos iy + \cos x \sin iy$$
$$= \sin x \frac{e^{iy} + e^{-iy}}{2} + \cos x \frac{e^{iy} - e^{-iy}}{2i}$$
$$= \sin x \frac{e^{-y} + e^{y}}{2} + \cos x \frac{e^{-y} - e^{y}}{2i}$$
$$= \sin x \frac{e^{-y} + e^{y}}{2} - i \cos x \frac{e^{-y} - e^{y}}{2}$$
$$= \sin x \frac{e^{y} + e^{-y}}{2} + i \cos x \frac{e^{y} - e^{-y}}{2}.$$

$$\text{Let } \sin x \frac{e^{y} + e^{-y}}{2} = r \cos z,$$
$$\text{And } \cos x \frac{e^{y} - e^{-y}}{2} = r \sin z;$$

Squaring and adding]

$$(\sin^2 x + \cos^2 x) \frac{e^{2y}}{4} - \frac{2 (\cos^2 x - \sin^2 x)}{4}$$
$$+ (\sin^2 x + \cos^2 x) \frac{e^{-2y}}{4} = r^2 (\sin^2 z + \cos^2 z),$$
$$\tfrac{1}{4} (e^{2y} - 2 \cos 2x + e^{-2y}) = r^2,$$
$$\therefore - \log 4 + \log (e^{2y} - 2 \cos 2x + e^{-2y})$$
$$= 2 \log r;$$

$$\text{Again, } \tan z = \cot x \frac{e^{y} - e^{-y}}{e^{y} + e^{-y}},$$
$$\therefore z = \tan^{-1} \cot x \frac{e^{y} - e^{-y}}{e^{y} + e^{-y}};$$

$$\text{Log } \sin^2 (x + iy) = 2 \log r (\cos z + i \sin z)$$
$$= 2 \log r + 2 \log e^{iz}$$
$$= - \log 4 + \log (e^{2y} - 2 \cos 2x + e^{-2y}) + 2iz$$
$$= \log (e^{2y} - 2 \cos 2x + e^{-2y})$$
$$- \log 4 + 2i \tan^{-1} \cot x \frac{e^{y} - e^{-y}}{e^{y} + e^{-y}}.$$

Note.—The question is given incorrectly in the First Edition of *Lock's* 'Trigonometry,' but is corrected in the Second Edition, and the identity is given as we have stated it.

General.

1. LEHRER.—A man and a boy pull a heavy weight by ropes inclined to the horizon at angles of 60° and 30°, with forces of 80 lbs. and 100 lbs. The angle between the two vertical planes of the cords is 30°; find the single horizontal force that would produce the same result. (*Magnus.*)

$$\text{Horizontal force of man} = (80 \cos 60^\circ) \text{ lbs.}$$
$$= (80 \times \tfrac{1}{2}) \text{ lbs.}$$
$$= 40 \text{ lbs.};$$
$$\text{,, ,, boy} = (100 \cos 30^\circ) \text{ lbs.}$$
$$= \left(100 \times \frac{\sqrt{3}}{2}\right) \text{ lbs.}$$
$$= 50 \sqrt{3} \text{ lbs.}$$
$$R^2 = P^2 + Q^2 + 2 P . Q \cos 30^\circ;$$

∴ Single horizontal force

$$= \sqrt{40^2 + (50 \sqrt{3})^2 + 2 . 40 . 50 \sqrt{3} . \cos 30^\circ} \text{ lbs.}$$
$$= \sqrt{1600 + 7500 + 4000 \sqrt{3} \times \frac{\sqrt{3}}{2}} \text{ lbs.}$$
$$= \sqrt{9100 + 6000} \text{ lbs.}$$
$$= \sqrt{15100} \text{ lbs.}$$
$$= 151'00(\underline{122\cdot88\ldots \text{ lbs.}} \text{ Ans.}$$

$$\begin{array}{r|l} & \underline{144} \\ 242 & 700 \\ & \underline{484} \\ 2448 & 21600 \\ & \underline{19584} \\ 24568 & 201600 \\ & \underline{196544} \\ & \underline{5056} \end{array}$$

2. RUCTATOR.—A body projected vertically downwards with a velocity of 40 ft. per second describes 120 ft. in a certain second; find the space described in the preceding second. (*Magnus*' 'Mechanics.')

The space described in any second

$$= u + \tfrac{1}{2}g (t^2 - t'^2),$$

where u = initial velocity,
g = force of gravity,
t = time of descent in seconds,
t' = 1 second less than t;

$$\therefore 120 = 40 + 16 (t^2 - t'^2),$$
$$80 = 16 (t^2 - t'^2),$$
$$5 = t^2 - t'^2$$
$$= (t + t') (t - t'),$$
$$\text{But } (t - t') = 1,$$
$$\therefore \left.\begin{array}{l} t + t' = 5 \\ \underline{t - t' = 1} \end{array}\right\}$$
$$2t = 6$$
$$\therefore t = 3.$$

∴ Space described in preceding second

$$= [40 + 16 (2^2 - 1^2)] \text{ ft.}$$
$$= (40 + 16 \times 3) \text{ ft.}$$
$$= \underline{88 \text{ ft.}} \text{ Ans.}$$

3. E. WORDSWORTH.—(1) The full solutions of the Arithmetic Questions, Second Year, Female Candidates for 1887, appeared in our issue for February, 1888, and for 1886 in our issue for April, 1887. (2) We can recommend *Capel's* 'Catch Questions in Arithmetic and Mensuration,' 4s. 6d. (*Hughes*); and *Capel's* 'Hand-book of Arithmetic for Pupil Teachers,' 2s. 6d. (*Hughes*).

4. DUPLEX.—The solution of your query appeared in our issue for March, 1888.

5. NONYEB.—Small hand is correct in form, graceful and elegant in shape. 95. The large hand, while bold and correct; lacks evenness and neatness. The down strokes are especially wanting in regularity and grace, 80.

6. JACK PEN.—Use Huxley's 4/6 manual, and read some parts of the larger book by Foster. You may use the Geometry and Perspective written by Yule.

7. STUDENT.—Johnson's select 'Lives of the Poets,' by Matthew Arnold. Macmillan, 6/-. Matthew Arnold's selections from Wordsworth's 'Golden Treasury,' 4/6. Selection from Burke's work in the Clarendon Press. Dr. Abbott's edition of Bacon's Essays, or F. Storr's.

8. BARTON.—We should think not, but you had better write and ask the Secretary of the Department.

9. ADA.—A marked list has been sent you. You might very well read Fitch's Lectures on Teaching. You might also find Currie's Infant School Education useful.

10. ASSISTANT.—The regulations are now so complicated that the best advice we can give you is to write to the Department.

11. INQUISITIVE.—We are not aware that there is the slightest difference made between those who have been and those who have not been Pupil Teachers. We do not think there is.

12. S. B.—In all probability you will get to know before that time. If you should not you can still enter upon your form that you have been examined, and are awaiting the result.

13. J. H. H.—We cannot say whether you are exactly correct. By referring to the Blue Book you will find an account of all the Colleges there. You should write to the Secretary of any one of them. He will be sure to give you any information in his power.

14. STUDENT.—We have never heard of any such title. We should be glad to recommend a book to you on any special subject. We do not think there is any such book as you name.

15. A STUDENT.—All Racine's works are translated in Bohn's edition. We do not think there is any translation of the other book you name. You would most likely be very pleased with Dr. Abbott's edition of Bacon's Essays or F. Storr's.

16. THOMAS D.—Only write on one side of the paper. You have marked some of the mistakes, but the writing is really so bad that it is of little use to do more than recommend you to practice writing in a good copy book half-an-hour a day for three months, and then send us a specimen of your work. The small hand is much better and shows promise.

17. R.S.O.—We have not seen the specimens you refer to. Would it not be better to put them all on the same paper? This Journal is especially intended to help students like yourself, and you can ask any questions you like any month. If we see the sort of biography you want we will make a note of it.

Algebra.

1. C. MANN.—Solve :—

$$\sqrt{x} + \sqrt{x} + \bar{3} = \frac{12}{\sqrt{x + 2}}.$$

(*Hughes*' 'Pupil Teachers' Examination Questions.')

$$\sqrt{x} + \sqrt{x + 3} = \frac{12}{\sqrt{x + 2}}$$

$$\sqrt{x\,(x + 2)} + \sqrt{(x + 3)\,(x + 2)} = 12$$

$$\sqrt{(x + 3)\,(x + 2)} = 12 - \sqrt{x\,(x + 2)}$$

Squaring both sides]

$$\begin{aligned}(x + 3)\,(x + 2) &= 144 - 24\sqrt{x\,(x + 2)} + x\,(x + 2)\\ x^2 + 5x + 6 &= 144 - 24\sqrt{x(x + 2)} + x^2 + 2x\\ 24\sqrt{x\,(x + 2)} &= 138 - 3x\\ 8\sqrt{x\,(x + 2)} &= 46 - x\end{aligned}$$

Squaring both sides]

$$\begin{aligned}64x\,(x + 2) &= 2{,}116 - 92x + x^2\\ 64x^2 + 128x &= 2{,}116 - 92x + x^2\\ 63x^2 + 220x &= 2{,}116\\ x^2 + \frac{220x}{63} &= \tfrac{2116}{63}\\ x^2 + \frac{220x}{63} + \left(\frac{110}{63}\right)^2 &= \frac{2116}{63} + \frac{12100}{63^2}\\ &= \frac{133308 + 12100}{63^2}\\ &= \frac{145408}{63^2}\\ x + \tfrac{110}{63} &= \pm \tfrac{1}{63}\sqrt{145408}\\ \therefore\ x &= \pm \tfrac{1}{63}\,(\sqrt{145408} - 110)\\ &= \pm \tfrac{1}{63}\,(\sqrt{142 \times 1024} - 110)\\ &= \pm \tfrac{1}{63}\,(32\sqrt{142} - 110).\end{aligned}$$

Note.—You gave the equation incorrectly, and the other is the solution as you sent it.

2. C.F.C.—Write down the factors of the expression

$$x^3 - x^2 - 14x + 24;$$

and hence deduce the factors of

$$x^3 + 2x^2y - 5xy^2 - 6y^3 - x^2 - 15xy + 4y^2 - 14x + 34y + 24.$$

(*Durham Papers, 1st Year Honours*, 1888.)

$$x^3 - x^2 - 14x + 24$$
$$= (x - 2)\,(x - 3)\,(x + 4).$$

In $x^3 + 2x^2y - 5xy^2 - 6y^3 - x^2 - 15xy + 4y^2 - 14x + 34y + 24$, since the terms involving x only and the absolute term are the same as in the above expression, we may assume that the expression

$$\begin{aligned}&= (x + ay - 2)\,(x + by - 3)\,(x + cy + 4)\\ &= x^3 + (a + b + c)\,x^2y + Axy^2 + By^3\\ &\quad - x^2 + (a + 2b - 5c)\,xy + Cy^3\\ &\quad - 14x - (12a + 8b - 6c)\,y + 24;\end{aligned}$$

Hence we get the three equations —

$$\left.\begin{array}{l}(1)\ a + b + c = 2\\ (2)\ a + 2b - 5c = -15\\ (3)\ 12a + 8b - 6c = -34\end{array}\right\}$$

From which we easily find that

$$a = -2,\ b = 1, \text{ and } c = 3;$$

Hence the factors are

$$(x - 2y - 2)\,(x + y - 3)\,(x + 3y + 4).$$

3. H. J. W.—A property of £10,000 is left to four children aged 6, 8, 10, and 12 years respectively, so that each child on attaining his majority shall receive the same amount of money, compound interest at the rate of 4½ per cent. per annum being allowed. What is the amount payable to each?

The amount of a given sum in pounds at compound interest $= PR^n$,

where P = principal in pounds,
R = amount of one pound in one year,
and n = number of years.

Let a, b, c, d represent the four shares;

$$\begin{aligned}\text{Then, } a\,(1{\cdot}045)^{15} &= b\,(1{\cdot}045)^{13}\\ = c\,(1{\cdot}045)^{11} &= d\,(1{\cdot}045)^{9};\\ b\,(1{\cdot}045)^{13} &= a\,(1{\cdot}045)^{15}\\ \therefore\ b &= a\,(1{\cdot}045)^2.\\ c\,(1{\cdot}045)^{11} &= a\,(1{\cdot}045)^{15}\\ \therefore\ c &= a\,(1{\cdot}045)^4.\\ d\,(1{\cdot}045)^9 &= a\,(1{\cdot}045)^{15}\\ \therefore\ d &= a\,(1{\cdot}045)^6.\end{aligned}$$

But, $a + b + c + d = £10{,}000$

$$\begin{aligned}\therefore\ a + (1{\cdot}045)^2 a + (1{\cdot}045)^4 a + (1{\cdot}045)^6 a &= £10{,}000\\ a\,[1 + (1{\cdot}045)^2 + (1{\cdot}045)^4 + (1{\cdot}045)^6] &= £10{,}000\\ a\,[1 + 1{\cdot}092025 + (1{\cdot}092025)^2 + (1{\cdot}092025)^3] &= £10{,}000\\ a\,[2{\cdot}092025 + 1{\cdot}192518600625 + 1{\cdot}302260124847515625] &\\ &= £10{,}000\\ \therefore\ a &= £10{,}000 \div 4{\cdot}586803725472515625\\ &= £16 \div {\cdot}007338885960756025\\ &= £64 \div {\cdot}0293555438430241\end{aligned}$$

$$\begin{array}{l} \qquad\qquad\quad\ \ £\qquad\ \ £\\ = 2935554)6400000(2{,}180\\ \qquad\qquad\quad\ \underline{5871108}\\ \qquad\qquad\quad\ \ 5288920\\ \qquad\qquad\quad\ \ \underline{2935554}\\ \qquad\qquad\quad\ \ 23533660\\ \qquad\qquad\quad\ \ \underline{23484432}\\ \qquad\qquad\qquad\ \ 492280\\ \qquad\qquad\qquad\qquad\ \ \underline{20}\\ \qquad\qquad\qquad\ 9845600(3\text{s.}\\ \qquad\qquad\qquad\ \underline{8806662}\\ \qquad\qquad\qquad\ 1038938\\ \qquad\qquad\qquad\qquad\ \ \underline{12}\\ \qquad\qquad\quad\ \ 12467256(4\text{d.}\\ \qquad\qquad\quad\ \ \underline{11742216}\\ \qquad\qquad\qquad\ \ \underline{725040}\end{array}$$

$\therefore$ First share = £2,180 3s. 4¼d.

$$\begin{aligned}b &= a\,(1{\cdot}045)^2\\ &= 1{\cdot}092025a\\ &= 1{\cdot}092025\end{aligned}$$

$$\begin{array}{l} \qquad\qquad\qquad\quad\ \ \underline{\quad 64}\\ \qquad\qquad\qquad\quad\ 4368100\\ \qquad\qquad\qquad\ \underline{6552150\ \ }\\ 2935554)69889600(£2{,}380\\ \qquad\qquad\quad\ \underline{5871108}\\ \qquad\qquad\quad\ 11178520\\ \qquad\qquad\quad\ \ \underline{8806662}\\ \qquad\qquad\quad\ \ 23718580\\ \qquad\qquad\quad\ \ \underline{23484432}\\ \qquad\qquad\qquad\ 2341480\\ \qquad\qquad\qquad\qquad\ \ \underline{20}\\ \qquad\qquad\qquad\ 46829600(15\text{s.}\\ \qquad\qquad\qquad\ \underline{2935554}\\ \qquad\qquad\qquad\ 17474060\\ \qquad\qquad\qquad\ \underline{14677770}\\ \qquad\qquad\qquad\ \ 2796290\\ \qquad\qquad\qquad\qquad\ \ \underline{12}\\ \qquad\qquad\qquad\ 33555480(11\text{d.}\\ \qquad\qquad\qquad\ \underline{2935554}\\ \qquad\qquad\qquad\quad 4199940\\ \qquad\qquad\qquad\quad \underline{2935554}\\ \qquad\qquad\qquad\quad \underline{1264386}\end{array}$$

$\therefore$ Second share = £2,380 15s. 11¼d.

$$c = a\,(1{\cdot}045)^4$$
$$= 1{\cdot}192518600625a$$

```
                64
     477007440250 0
    7155111603750
2935554)76321190440000(£2,599
    5871108
    17610110
    14677770
     29323404
     26419986
     29034184
     26419986
      2614198
           20
      52283960( 17s.
      2935554
      22928420
      20548778
       2379642
            12
      28555704( 9d.
      26419986
       2135718
```

∴ Third share = £2,599 17s. 9¾d.

$$d = a\,(1{\cdot}045)^6$$
$$= 1{\cdot}30226012484751 5625a$$
$$= 1{\cdot}3022601248$$

```
                64
      52090404992
     781356074 88
2935554)833446479872(£2,839
     5871108
     24633567
     23484432
      11491359
       8806662
       26846978
       26419986
         426992
             20
        8539840(2s.
        5871108
        2668732
             12
       32024784(10d.
       2935554
        2669244
```

∴ Fourth share = £2,839 2s. 10¾d.

		£	s.	d.
First share	=	2,180	3	4¼
Second share	=	2,380	15	11¼
Third share	=	2,599	17	9¾
Fourth share	=	2,839	2	10¾
		£10,000	0	0

4. J. GUILD.—Find a and b that

$$x^3 + ax^2 + 11x + 6$$
$$\text{and } x^3 + bx^2 + 14x + 8,$$

may have a common factor of the form $x^2 + Ax + B$.

(*Intermediate Arts*, 1880.)

$$x^3 + ax^2 + 11x + 6)\,x^3 + bx^2 + 14x + 8\,(1$$
$$\underline{x^3 + ax^2 + 11x + 6}$$
$$(b-a)x^2 + 3x + 2$$

As the common factor is of the form $x^2 + Ax + B$,

$$\therefore (b-a)x^2 = x^2, \text{ and } (b-a) = 1.$$

$$x^2 + 3x + 2)\,x^3 + ax^2 + 11x + 6\,(x + 3$$
$$\underline{x^3 + 3x^2 + 2x}$$
$$(a-3)x^2 + 9x + 6$$
$$\underline{3x^2 + 9x + 6}$$

$$a - 3 = 3$$
$$\therefore\ a = 6.$$

Wherefore, $a = 6$, and $b = 7$.

5. C. MANN.—Solve the equation :—

$$\sqrt{x} + \sqrt{x+3} = \frac{12}{\sqrt{x}+2}.$$

(*Hughes'* 'Examination Questions.')

$$\sqrt{x} + \sqrt{x+3} = \frac{12}{\sqrt{x}+2}$$
$$x + 2\sqrt{x} + \sqrt{x(x+3)} + 2\sqrt{x+3} = 12$$
$$\sqrt{x(x+3)} + 2\sqrt{x+3} = 12 - 2\sqrt{x} - x$$

Squaring each side.]

$$x(x+3) + 4(x+3)\sqrt{x} + 4(x+3)$$
$$= 144 + 4x + x^2 - 48\sqrt{x} - 24x + 4x\sqrt{x}$$
$$x^2 + 3x + 4x\sqrt{x} + 12\sqrt{x} + 4x + 12$$
$$= 144 + 4x + x^2 - 48\sqrt{x} - 24x + 4x\sqrt{x}$$
$$3x + 12\sqrt{x} + 12 = 144 - 48\sqrt{x} - 24x$$
$$3x + 24x + 12\sqrt{x} + 48\sqrt{x} = 144 - 12$$
$$27x + 60\sqrt{x} = 132$$
$$x + \tfrac{20}{9}\sqrt{x} = \tfrac{44}{9}$$
$$x + \tfrac{20}{9}\sqrt{x} + (\tfrac{10}{9})^2 = \tfrac{44}{9} + \tfrac{100}{81}$$
$$= \tfrac{496}{81}$$
$$\sqrt{x} + \tfrac{10}{9} = \frac{\pm\sqrt{496}}{9}$$
$$\sqrt{x} = \frac{\pm\sqrt{496} - 10}{9}$$
$$\therefore\ x = \frac{496 \pm 20\sqrt{496} + 100}{81}$$
$$= \frac{596 \pm 20\sqrt{16 \times 31}}{81}$$
$$= \tfrac{1}{81}\,(596 \pm 80\sqrt{31}).$$

6. A. B.—Show that if

$$\frac{ay - bx}{c} = \frac{cx - az}{b} = \frac{bz - cy}{a},$$

$$\text{then } \frac{x}{a} = \frac{y}{b} = \frac{z}{c}. \quad (\textit{Todhunter.})$$

First Method.

$$\frac{ay - bx}{c} = \frac{cx - az}{b} = \frac{bz - cy}{a}$$
$$= \frac{c(ay - bx)}{c^2} = \frac{b(cx - az)}{b^2} = \frac{a(bz - cy)}{a^2}$$
$$= \frac{c(ay - bz) + b(cx - az) + a(bz - cy)}{c^2 + b^2 + a^2} \text{ (Article 384.)}$$
$$= \frac{acy - bcx + bcx - abz + abz - acy}{c^2 + b^2 + a^2}$$
$$= 0;$$

$$\therefore \frac{ay - bx}{c} = \frac{cx - az}{b} = \frac{bz - cy}{a} = 0,$$

$$\text{Then, } \left.\begin{array}{l} ay - bx = 0 \\ cx - az = 0 \\ bz - cy = 0 \end{array}\right\}$$

$$\left.\begin{array}{l} ay = bx, \ \therefore \dfrac{y}{b} = \dfrac{x}{a} \\ cx = az, \ \therefore \dfrac{x}{a} = \dfrac{z}{c} \end{array}\right\}$$

$$\therefore \frac{x}{a} = \frac{y}{b} = \frac{z}{c}.$$

Second Method.

$$\text{Let } \frac{x}{a} = \frac{y}{b} = \frac{z}{c} = p,$$

$$\text{Then, } x = ap,\ y = bp,\ z = cp,$$

$$\text{And, } \frac{ay - bx}{c} = \frac{abp - abp}{c} = 0,$$

$$\frac{cx - az}{b} = \frac{acp - acp}{b} = 0,$$

$$\frac{bz - cy}{a} = \frac{bcp - bcp}{a} = 0;$$

$$\text{Hence, if } \frac{ay - bx}{c} = \frac{cx - az}{b} = \frac{bz - cy}{a},$$

$$\text{then } \frac{x}{a} = \frac{y}{b} = \frac{z}{c}.$$

Note.—The PRACTICAL TEACHER is usually ready on the 26th or 27th of the month.

Practical Needlework in Elementary Schools.

BY MISS J. W. WARREN,

Inspectress of Needlework to the Leicester School Board.

REFERRING again to the 'join' in hemming let me suggest the details as follows: when the first join is determined upon let the child undo *not half a stitch*, but *one*, *two* or *more*; she will then learn practically what the teacher means by the process described last month, viz., 'With your needle place the end of cotton *between* the hem fold.' This being done rightly by every child in class, have the needle first pointed then put through the hem fold, exactly as in the diagram given: at this point again make a minute examination of each child's work. Also *sketch on black board* the diagram. Some children more readily take instruction by the eye than by the ear. The thumb must prevent the new end from slipping right through; the ends should be seen, after the stitches have been done to secure them; this is the only way of getting strength at first. Later on the child will of course learn to conceal them without slipping them under too far to be caught, but at first on no account demand this.

Before a garment is begun it will be necessary to do a little practice in hemming *across the threads*, or else the pinafore curves, &c., will be very poorly done. Spare a month of your year for this, and you can at the same time use up the thousand and one cuttings that will have accumulated from time to time; the material too might now vary—*calico*, *holland*, *print*.

We can now go on to the seam stitch, one of the easiest though the most abused stitches in the schedule. Upon Sheet III. will be found the drill.

Plan.—If you cannot get striped calico provide each child with two pieces of foolscap paper, fixed as for a seam, about two stitches worked. Now by pattern and explanation direct them to put the needle through from behind upon the blue line, which I will suppose runs downwards in your pieces. When the pieces are loosely sewn together by this means cut tacking thread and pull them apart; the hidden line will be plainly seen to run *straight* from back to front, and the slope above will be sufficiently exaggerated to convince the child at a glance of the *difference in shape* between *hem* and *seam* stitch (see diagram). One lesson will be enough with the paper. Of course it is to serve but the one purpose named above—to show direction. Be prepared the next work-day with a few beautifully done specimens from upper standards; pass these round the class, calling attention to size and slope of stitch. I have found this an unfailing means of stimulating to excellence of work. (In fact so important do I consider it that I am in the habit of working my own specimens when out of those required.)

When these have been thoroughly looked into distribute prepared unbleached calico specimens not begun—needles threaded with red cotton.

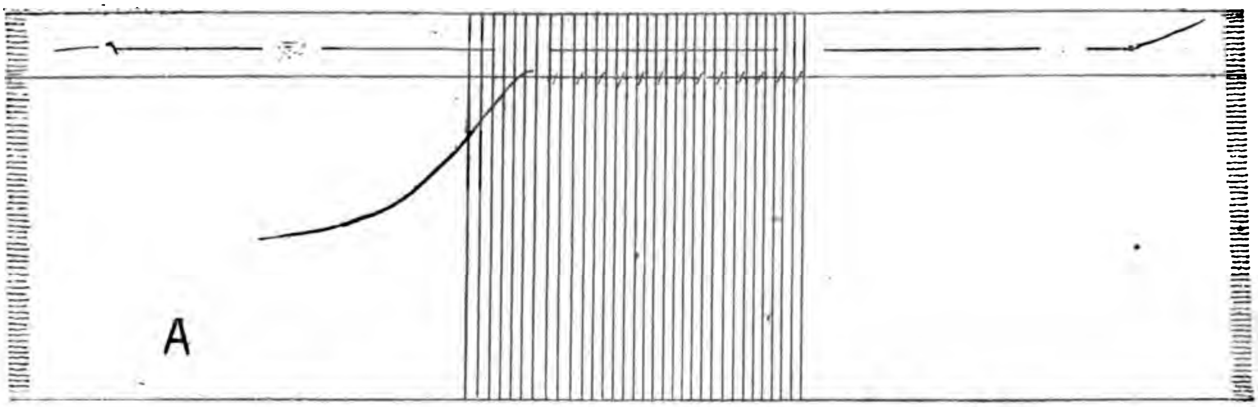
Holding the work.—Pick it up as in hemming (by the way, the specimen should be longer than the length of hand from finger tip to wrist). The five inch piece is scarcely sufficient, as one of the first things you must teach is to hold a small piece between finger and thumb, and the rest *under the hand*, the idea of keeping this part above the fork of finger and thumb is entirely without common sense or reason, and leads to very faulty work in garments; even in the specimen time it gets in the way of cotton, needle, and eyes. Do not let a stitch be done until you are satisfied with this left-hand practice.

Beginning.—Going on the knowledge that a good teacher reduces rules to a minimum, we will have the needle picked up and held *as for seaming*, but, instead of pulling it in at the back, with the needle's point tipped forwards, put it through only the front fold for a start, pull carefully until the end is the same length as when you fasten on in hemming, now with several stitches, six at least, pass your needle under this end pull these stitches tighter than usual; you have now begun on the seaming.

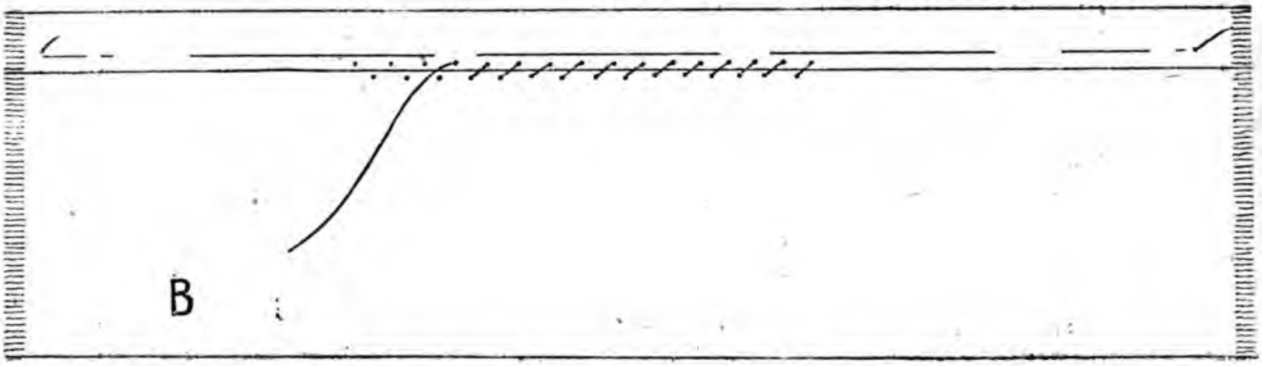
With all these precautions you can now fairly launch upon your actual work, but do not let your pupils set even two stitches by themselves; though the thing is so simple, it can be done badly without proper precautions. Turn for a moment to the Seaming Drill, the first order says 'Push the needle to its middle,' when there the forefinger and thumb should assist in completing the stitch, the thimble doing an undue share will cause the needle to rock to and fro—this is a common fault in seaming. I have said 'curve the hand' in preference to 'raise the elbow;' the effect is raising of elbow, the cause rather than the effect I give as being more immediately under the child's eye. Now as to depth of stitch from the top of the fold, too little is much the worse fault, and a thread cannot always be relied upon. The child should be taught to put the point just out of sight and no more; this simple plan will effectually prevent the *split* seaming one so often sees, where the one thread gauge is taught. Seaming should always occupy a shorter time (I mean duration of lesson) than hemming, for though easy to get exact it is much more trying to the muscles of the right arm, as the elbow must be lifted from its normal position the whole time; directly it is allowed to drop from weariness or any other cause we get a *puckered seam*, and no amount of scolding will rectify this; it is better to leave off at once—confessing that it is the result of a thoughtless teacher, not of a careless child.

What is true of hemming is even more true of seaming, that to work in a line with the selvedge is best; the reverse way causes the stitches to sink deep into the material, thus their regularity is impaired. In closing these directions on this stitch I will just observe that the selvedge should always be cut off for beginners.

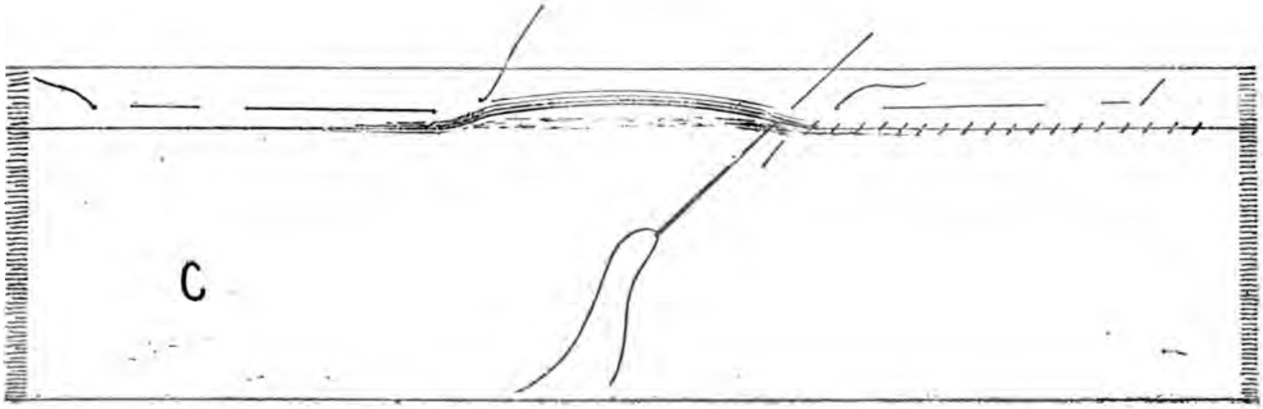
I do not explain the join in this Standard's work, as it will occur with Standard II. Next month I hope to give patterns of suitable garments to be worked, and finish the felling specimen.



A. Shows hemming on striped calico, very easy to fix.



B. Shows hemming on dotted calico, very difficult to fix.



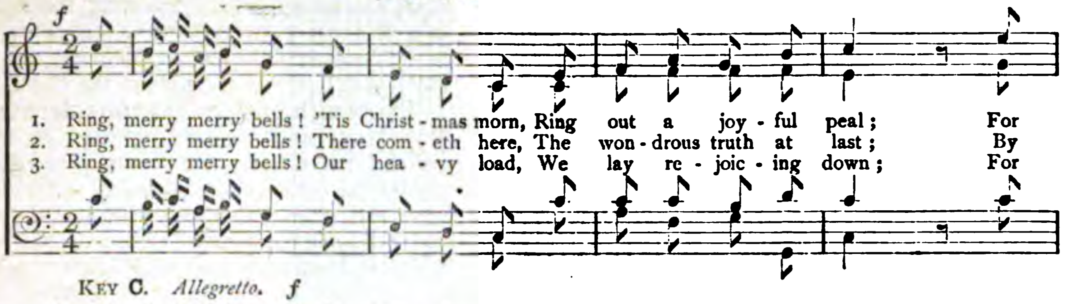
C. Shows the exact stitch to be taken in a join in hemming, the hem is lifted in this sketch to show the underneath.

(*To be continued.*)

—o—

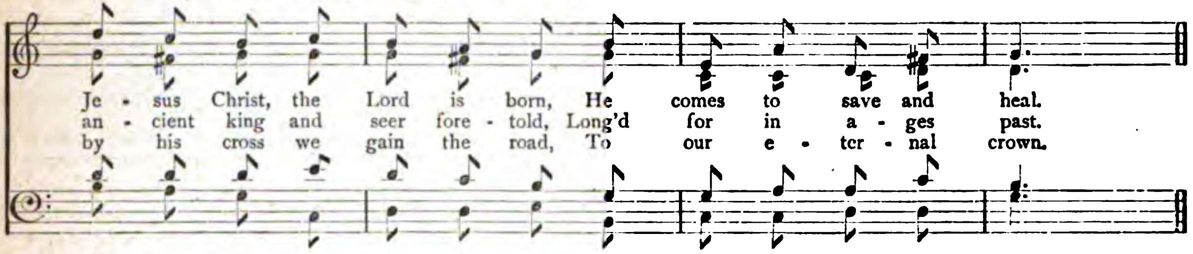
RING, MERRY BELLS.

Allegretto. (Christmas Carol.) Music by T. Crampton.


f
1. Ring, merry merry bells! 'Tis Christ - mas morn, Ring out a joy - ful peal; For
2. Ring, merry merry bells! There com - eth here, The won - drous truth at last; By
3. Ring, merry merry bells! Our hea - vy load, We lay re - joic - ing down; For

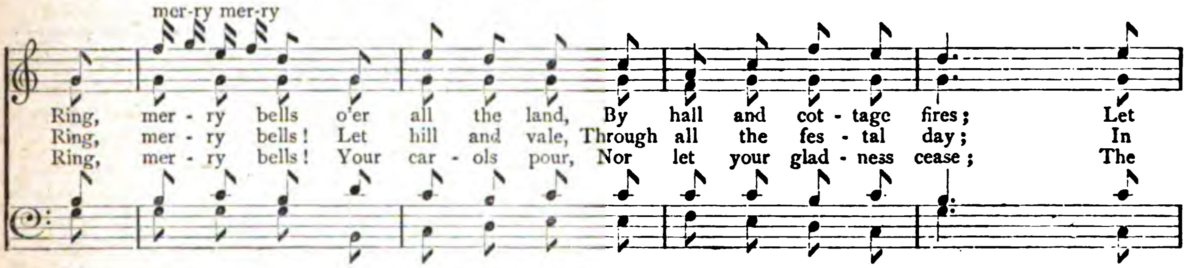
Key C. *Allegretto.* *f*

.d'	t ,d'.l ,t :s .f	m .r :d .m	f .l :s .t	d' : .m'
.d'	t ,d'.l ,t :s .f	m .r :d .d	f .f :f .f	m : .s
.d'	t ,d'.l ,t :s .f	m .r :d .d'	d' .d' :t .r'	d' : .d'
.d'	t ,d'.l ,t :s .f	m .r :d .d'	l .f :s .s_1	d : .d'


Je - sus Christ, the Lord is born, He comes to save and heal.
an - cient king and seer fore - told, Long'd for in a - ges past.
by his cross we gain the road, To our e - ter - nal crown.

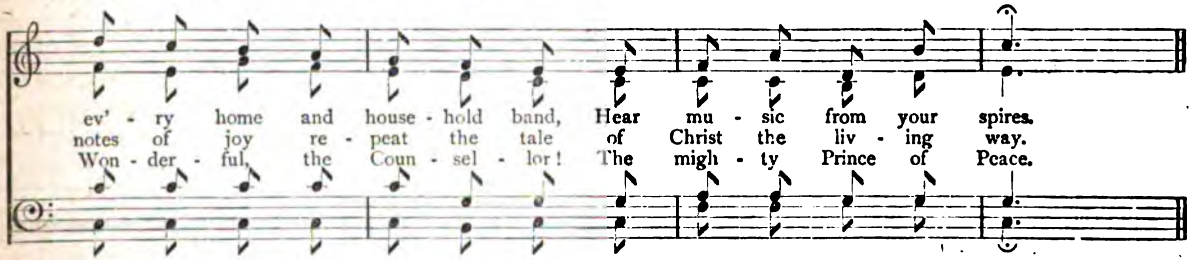
G.t.

^{r}s .f :m .f	m .r :d .m	l_1 .r :s_1 .t_1	d :— .
^{s}d .t_1 :d .d	d .t_1 :d .d	f_1 .f_1 :f_1 .s_1	s_1 :— .
^{r}s .s :s .l	s .f :m .d	d .r :m .f	m :— .
^{t}m .r :d .f_1	s_1 .s_1 :l_1 .m_1	f_1 .f_1 :s_1 .s_1	d :— .


mer-ry mer-ry
Ring, mer - ry bells o'er all the land, By hall and cot - tage fires; Let
Ring, mer - ry bells! Let hill and vale, Through all the fes - tal day; In
Ring, mer - ry bells! Your car - ols pour, Nor let your glad - ness cease; The

f.C.

.^{d}s	f' ,s' .m' ,f' :r .s	m' .r' :d' .d'	l .d' :f' .m'	r' :– .m'
.^{d}s	s .s :s .s	s .s :s .s	f .s :s .s	s :— .s
.^{m}t	t .d' :t .r'	d' .t :d' .d'	d' .d' :t .d'	t :— .d'
.^{d}s	s .s :s .t_1	d .r :m .m	f .m :r .d	s :— .d


ev' - ry home and house - hold band, Hear mu - sic from your spires.
notes of joy re - peat the tale of Christ the liv - ing way.
Won - der - ful, the Coun - sel - lor! The migh - ty Prince of Peace.

r' .d' :t .l	s .f :m .m	f .l :r .t	d' :— .
f .m :s .f	m .r :d .d	d .d :t_1 .r	m :— .
d' .d' :d' .d'	d' .s :s .s	l .l :s .s	s :— .
d .d :d .d	d .t_1 :d .d	f .f :s .s	d :— .

Oral Teaching: The Preparation of Lessons and of Notes of Lessons.

BY JOSEPH H. COWHAM, F.G.S.,
Master of Method: Westminster Training College, S.W.

The following topics have already been discussed in previous chapters on Oral Teaching:—The matter of a lesson and its arrangement in a series of stages following each other in logical sequence; the method by which each item of information is brought within the knowledge of the pupil; how the effort to obtain this knowledge may be made a means of intellectual discipline and training; the best method of statement on the part of the teacher, and the most effective modes of reply on the part of the class. To these essential conditions of successful oral teaching there remains to be considered the manner, speech, and tact of the teacher, and the discipline and intelligence of the class.

(A) Manner of the Teacher.

1. **Earnestness.**—This is one of the first requisites of a good teacher. He must feel that the success of his lesson is an object worthy his best effort; that he cannot afford to fail, for that will rob him of that confidence in his own power which is essential to success; he ought to experience after every lesson that the satisfaction arising from successful and faithful effort is one of the chief enjoyments of his school life. The enthusiasm and evident enjoyment with which he opens out each new stage in his lesson, and the interest which he throws around the entire effort, are readily communicated to his pupils, amongst whom in this way a corresponding interest and effort are awakened and sustained.

No amount of information, of careful preparation, or of material for illustration will avail if the teacher be lacking in earnestness. On the other hand, there are many teachers whose information is limited, who, nevertheless, aided by an earnest and enthusiastic manner, arouse their classes to successful effort in a marked degree. When, however, a wide knowledge and an abundance of material are at the disposal of an earnest teacher the most favourable conditions for successful teaching are secured.

2. **Activity.**—An amount of bodily movement is necessary in the effort of teaching. Having taken up a position from whence he can command a view of his entire class, the teacher, whilst maintaining this place for the most part, should allow himself a certain freedom of departure from that position; on no account, however, should he move towards his scholars until he is almost in contact with those in the front row, neither should he move from side to side without directly facing any portion of his class.

The **mental activity** of the teacher is of high value for the purposes of class teaching, and when it exists there will be sufficient bodily movement. He who without hesitation gauges the condition of his class from the statements they make, or from their look of mute enquiry; he who can immediately turn either their answers or their silence to effective account; he who takes in the mental condition of each scholar at a glance, and who applies the stimulus necessary for successful effort; the one whose mind is thus mentally active, he is the teacher most likely to be successful in arousing and keeping a state of mental activity in his class. Under such a teacher no pupil feels at liberty to be inert, all feel that they must do their utmost to succeed, not so much however from fear of the consequences following indifference and failure on their part, as from a feeling of sympathy with the mental brightness and activity of the teacher, imitated and reflected throughout the class.

3. **Thorough, patient, and considerate.**—Whilst bodily activity and mental brightness on the part of the teacher are of high value in stimulating the children to intellectual effort, it is necessary to remember that children do not all acquire knowledge at the same rate, hence with some members of the class it will be needful to repeat, with others to correct, and all will be benefitted by a well-conducted review. Repetition, correction, and general review, however, may be effected without in any way reflecting upon the pupil who is slow, and without wearying those who are naturally quick. Let the clever state again for the benefit of the dull, and do not suppose that the patience and effort necessary to inform the weak are wasted upon the strong, for these frequently need to repeat that which they readily gain in order to prevent its rapid loss.

(B) The Teacher's Language and Voice.

The youthful teacher should spare no pains to gain the power of expressing himself in simple and correct speech, for next in value to the power of imparting ideas is that of clothing them in correct language. Children are great imitators, and in nothing is this more manifest than in the efforts they put forth to copy the style of speech, and, to some extent, the very words of their teacher. The oral lesson partakes, more than any other school efforts, of the purely conversational form of speech, and is the exercise which allows the most natural use of language. Thought is being awakened and knowledge is being acquired, thus the necessity for new language is being experienced. It is at this time especially important that the most apt and suitable terms should be introduced, for the associations of ideas with language now being formed are likely to be both permanent and valuable. Correct speech is acquired by practice, and tends to become habitual in those who use it. To form the habit the learner should seize every opportunity of conversing with those who speak well. Loose and slovenly forms of speech when indulged in frequently cannot be discarded at will; they are almost sure to manifest themselves during the progress of a lesson, particularly when full effort of thought is otherwise occupied. Reading choice books will be helpful to clear and simple statement, but nothing short of actual practice after excellent models can give facility in correct speech.

An agreeable voice is a gift, and its possessor is to be congratulated. By acquiring however a variety in expression, a voice less favoured may be made in a measure attractive. On no account should the voice be raised to an unnatural pitch, or assume a slow and monotonous drawl.

(C) Tact.

This is a term of wide meaning. It is, however, specially applied to the ability a good teacher manifests in readily and successfully dealing with difficulties which arise during the course of a lesson, and which cannot be anticipated. These unforeseen circumstances afford the best tests of teaching ability. Tact in this sense is the result of a full knowledge of the subject under discussion, a thorough insight into the child's mode of thought, and an ability to utilise the wider knowledge possessed by the teacher in order successfully to deal with an unexpected line of thought started by some member of the class. Tact in *managing* is as important as tact in teaching. During the giving of a lesson this form of tact is seen when the teacher secures the entire attention of his class by the constant demand which his glance requires to effort, by the judicious distribution of his questions, and by the interest which his subject arouses and his manner secures. These should be the chief aids to discipline which the teacher introduces during the course of his lesson. Nothing is more likely to mar the effect of a lesson than frequent interruptions for the purpose of individual reproof.

(D) The Intelligence of the Class.

The aim of the teacher should always be twofold—(1) To impart information, and to lead the children to gain knowledge; (2) To secure the exercise and the development of the mental powers.

The latter result is by far the most important. This truth has constantly been urged throughout the preceding chapters. It is necessary here only to recall, by a brief summary, the powers of intellect which the teacher should recognise and train, and the means most likely to secure their successful training.

1. By bringing objects and experiments wherever possible before the scholars, in order to stimulate and direct **their observing powers.**
2. By arranging the matter taught so that either by the associations of similarity, contrast, and logical sequence, or by repetition and revisions aided by an aroused interest, **the memory may be exercised and strengthened.**
3. By means of graphic descriptions, assisted by picture and model, to lead children to re group their mental images, and to realize knowledge which is outside and beyond their actual experience. **In this way the imagination may be aroused and developed.**
4. By taking the knowledge which children learn by the effort of direct observation, and which they retain by the action of memory, together with that they secure by the effort of imagination, and by classifying this knowledge to lead them to discover generalized and abstract truths. In this way our scholars are gradually conducted towards and into those processes of thought **termed Conception, Judgment, and Reasoning.**

(To be continued.)

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Model Answers to Pupil Teachers' Examination Papers.

October 20th, 1888.

END OF FIRST YEAR.

(Three hours and a half allowed.)

Arithmetic.

BOYS ONLY.

(Do three questions only, including question 4, if you can.)

1. Simplify $\dfrac{\frac{3}{7}\text{ of }5\frac{1}{11} - \frac{5}{9}\text{ of }4\frac{4}{17} + \frac{7}{10}\text{ of }7\frac{9}{13}}{\frac{1}{143}}$.

2. Divide the sum of 5·08, 3·175, and ·09 by the difference of 74·709 and 73·04.

3. Reduce £3 4s. 5½d. to the decimal of £11 5s. 7¼d., and find the value of ·0025 of £3 6s. 8d.

4. Explain what is meant by the statement that ·$\dot{3}$ = ⅓, and find in pence the difference between ·333 and ·$\dot{3}$ of £8 6s. 8d.

(1)

$$\frac{\frac{3}{7}\text{ of }5\frac{1}{11} - \frac{5}{9}\text{ of }4\frac{4}{17} + \frac{7}{10}\text{ of }7\frac{9}{13}}{\frac{1}{143}}$$
$$= \frac{\frac{3}{7}\times\frac{56}{11} - \frac{5}{9}\times\frac{72}{17} + \frac{7}{10}\times\frac{100}{13}}{\frac{1}{143}}$$
$$= \frac{\frac{24}{11} - \frac{40}{17} + \frac{70}{13}}{\frac{1}{143}}$$
$$= (2\tfrac{2}{11} - 2\tfrac{6}{17} + 5\tfrac{5}{13}) \times \tfrac{143}{1}$$
$$= 5\frac{442 - 858 + 935}{2431}$$
$$= 5\tfrac{519}{2431} \times 143$$
$$= \underline{745\tfrac{9}{17}}.\text{ Ans.}$$

(2)

	5·08
74·709	3·175
73·04	·09
1·669)	8·345(5. Ans.
	8·345

(3)

$$\frac{£3\ 4s.\ 5\frac{1}{2}d.}{£11\ 5s.\ 7\frac{1}{4}d.} = \frac{3094}{10829} = \frac{2}{7} = \underline{\cdot\dot{2}8571\dot{4}}.\text{ Ans.}$$

·0225 of £3 6s. 8d.
$$= \tfrac{1}{400} \times \tfrac{10}{3}$$
$$= \tfrac{1}{120}$$
$$= \underline{2d.}\text{ Ans.}$$

(4) If $\frac{1}{9}$ be converted into a decimal it is found to be ·1 recurring or ·$\dot{1}$; while $\frac{3}{9}$ is ·3 recurring. But $\frac{3}{9}$ is the same as ⅓ ∴ ·$\dot{3}$ = ⅓.

$$\cdot 333 \times £8\tfrac{1}{3} = £2\cdot 775 = £2\ 15s.\ 6d.$$
$$\cdot\dot{3} \times £8\tfrac{1}{3} = \tfrac{1}{3} \times \tfrac{25}{3} = \tfrac{25}{9} = £2\ 15s.\ 6\tfrac{2}{3}d.$$
$$\text{Diff.} = \underline{\tfrac{2}{3}d.}\text{ Ans.}$$

GIRLS ONLY.

(Do three questions only, including Question 4, if you can.)

1. Find the value of 759 acres at £2 11s. 9d. per acre (by Practice).

2. Make out the following bill :—

1,000 yards of calico, at 7½d. per yard;
220 doz. reels of cotton, at 5½d. per doz. reels;
76 packets of needles at 3¾d. per packet;
250 bags, at 5s. 4d. per score.

3. Make out the following account of receipts and expenditure, and strike the balance :—

A shopkeeper receives on Monday, £3 14s. 8d; on Tuesday, £5 11s. 9½d.; on Wednesday, £7 16s. 4d.; on Thursday, £5 10s. 8d.; on Friday, £6 14s. 3½d.; and on Saturday, £26 8s. 3d. His weekly household expenditure has been £3 17s. 10½d., and he has paid bills to the amount of £37 8s. 4d.; the balance in favour carried forward the previous week was £15 11s. 4d. What will be the balance at the end of the week?

4. Find the greatest common measure of 135219 and 132753, and show that no other number can be the greatest common measure.

(1)

	£	s.	d.	
10s. = ½ £	759	0	0	= value of 759 at £1 each.
			2	
	1518	0	0	= ,, £2 ,,
	379	10	0	= ,, 10s. ,,
1s. 8d. = ⅙ of 10s.	63	5	0	= ,, 1s. 8d. ,,
1d. = $\frac{1}{20}$ of 1s. 8d.	3	3	3	= ,, 1d. ,,
	1963	18	3	= value of 759 at £2 11s. 9d.

(2)

114, Oxford Street,
London, Oct. 20th, 1888.

Mrs. Jones,
Bought of Brown & Robinson.

	£	s.	d.
1000 yards calico, at 7½d. per yard	31	5	0
220 doz. reels cotton, at 5½d. per doz.	5	0	10
76 packets needles, at 3¾d. per pkt.	1	3	9
250 bags, at 5s. 4d. per score	3	6	8
	40	16	3 Ans.

(3)

Receipts. £	s.	d.	Payments. £	s.	d.
3	14	8	3	17	10½
5	11	9½	37	8	4
7	16	4	41	6	2½
5	10	8			
6	14	3½			
26	8	3			
15	11	4			
71	7	4			

Balance in favour =
£30 1s. 1½d. Ans.

(4)

```
132753)135219(1
       132753
         2466)132753(53
              12330
               9453
               7398
               2055)2466(1
                    2055
                     411)2055(5
                         2055
```

G.C.M. = 411. Ans.

411 measures both 132,753 and 135,219. For it measures itself, and it measures any multiple of itself, as 2,055. It also measures 2,055 + itself, or 2,466. It also measures any multiple of 2,466 + 2,055 or 132,753. It also measures 132,735 + 2,466 or 135,219. Therefore, it measures both 132,753 and 135,219.

Now every common measure of two numbers measures their difference. ∴ every common measure of these two numbers measures 2,466 and 132,753. Similarly, every common measure of 2,466 and 132,753 is a common measure of their difference as 2,055. Therefore, every common measure of 132,753 and 135,219 is a measure of 2,055. It is, therefore, a common measure of 2,055 and 2,466. And it is also a common measure of their difference as 411. But no number greater than 411 can measure ltself. Therefore 411 is the G.C.M. of 132,753 and 135,219.

Grammar.

BOYS AND GIRLS.

(Answer questions 1 and 2, and one other question.)

1. On *some* fond breast the *parting* soul *relies*,
Some pious drops the closing eye *requires;*
E'en from the tomb the voice of Nature cries,
E'en in *our* ashes live their *wonted* fires.

Point out the subject, predicate, and other parts of each of the sentences contained in this verse.

2. Parse the words printed in italic in Question 1.

3. Show the meaning of the final syllable in each of the following words, and give in each case two other examples of words similarly formed:—

King*dom*,	Stream*let*,	Good*ness*,
Lead*en*,	Storm*y*,	Hard*ly*.

4. What is meant by *Mood* in Grammar? Show by examples how to distinguish the various moods, and what is the use of the distinction?

(1)
(*a*) *Subj.*—The parting soul
Pred.—relies
Obj. (*Ind.*)—on some fond breast.
(*b*) *Subj.*—The closing eye
Pred.—requires
Obj.—some pious drops.
(*c*) *Subj.*—The voice of Nature
Pred.—cries
Ext. of Pred.—even from the tomb.
(*d*) *Subj.*—Their wonted fires
Pred.—live
Ext. of Pred.—even in our ashes.

(2) *Some*—indef. numeral adj., qualg. *breast.*
parting—participial adj. of qual., qualg. *soul.*
relies—verb, reg., intrans., act., indic., pres., agreeing with *soul.*
requires—verb, reg., trans., act., indic., pres., 3rd sing., agreeing with *eye.*
even—adj. of degree, modifying the phrase, 'from the tomb.'
our—pronoun, pers., 1st plur., com., poss. case, gov. by *ashes.*
wonted—adj. of quality, qualg. *fires.*

(3) *-dom*—state; dukedom, princedom.
-en—made of; golden, earthen.
-let—(diminutive) little; ringlet, rivulet.
-y—the adjective form of the noun; windy, rainy.
-ness—denoting abstract quality; kindness, wickedness.
-ly—like; worldly, daily.

(4) *Mood* is the form of the verb used to denote the mode or manner in which the action denoted by the verb is presented to the mind. An expression may be direct, or a question may be asked. The verb is then said to be in the Indicative Mood, as, I went; Did he go? If a command is given, as, Stand still; Run away, the Mood is said to be Imperative. If a condition is named, or doubt, uncertainty, or supposition expressed, as, If I go; Unless he come, the verb is said to be in the Conditional or Subjunctive Mood. If the form of the verb is used which denotes an action or state without reference to the agent, as, to run; to walk, the verb is said to be in the Infinitive Mood.

Geography.

BOYS AND GIRLS.

(Answer three questions only.)

1. Explain the terms 'watershed' and 'river-basin,' and illustrate your explanation by examples from the North of England or from British North America.

2. Name the principal industries which have risen upon the Northumberland, South Lancashire, and Warwickshire coal-fields, and point out the natural causes of the growth of those industries.

3. Describe the physical features of Ireland.

4. Give some account of Oban, Dundee, Aberdeen, Port Jackson, Brisbane, New Westminster, and Ottawa.

5. Write a short letter, as from a settler in north-west Canada, to a friend in England, descriptive of his life and occupations in the summer months.

6. Draw a map (physical and political) of—
(*a*) England (south of a line drawn from Bristol to Yarmouth);
or, (*b*) The Dominion of Canada (west of the Rocky Mountains);
or, (*c*) The Colony of Victoria.

(1) 'Watershed' means 'water parting,' and is the high land which separates two 'river basins,' or series of river basins. 'River-basin' is the whole of the land drained by a river and its tributaries.

The Pennine Chain is the chief watershed of the North of England. It divides the rivers which flow into the North Sea from the rivers which flow into the Irish Sea. [Draw sketch map.] But the Tyne, Wear, Tees, and Ouse, have each their own basin. The Tyne is separated from the Wear by the rising ground, of which Kilhope Law and Pontop Pike are the highest points. The Wear is separated from the Tees by the slightly rising ground extending across the whole of the county of Durham. The Tees is separated from the Ouse by a spur of the Pennine Chain.

(2) *Northumberland.*—Shipbuilding, iron manufactures, machinery, engine building, chemical manufactures.

South Lancashire.—Cotton manufactures, silk, machinery, iron, glass, chemical manufactures.

Warwickshire.—Iron of every kind, electro-plated and fancy goods.

In Northumberland the proximity of coal and iron, the presence of good rivers, especially the Tyne, and the fact that it is the birthplace of the locomotive, account for most of the manufactures.

In Lancashire the facts are somewhat similar. In addition, it is the nearest coalfield to the chief port at which cotton is imported.

In Warwickshire coal and iron are also present together, but the absence of any river will account for the fact that only manufactures are carried on in iron.

(3) Ireland may be described as oval in shape, having a much-indented western coast. Its surface consists of a great plain, surrounded by a fringe of mountains, the greatest elevation being in the West. The chief mountains are the Mourne Mountains, in Co. Down; the mountains of Antrim, Donegal,

Mayo (including Mount Nephin, and the Connemara Mountains); the Kerry Mountains, consisting of several parallel ranges, one of which (the Macgillicuddy's Reeks) has Curran Tual, the loftiest point in Ireland; the Knockmeledown Mountains, and the Wicklow Mountains. The Slieve Bloom Mountains are in the interior. The rivers are sluggish, and, with the exception of the Shannon, 220 miles long, of little commercial importance. The chief are the Shannon, Liffey, Bandon, Lee, Blackwater, Barrow, Suir, Slaney, Boyne, Bann, Foyle. The chief lakes are Allen, Ree, and Derg, in the course of the Shannon; Neagh, Corrib, Mask, Erne, and Killarney, the latter noted for their beauty. The northern and western shores are lofty, wild, rocky, and barren. The Giants' Causeway, a series of basaltic rocks, is found in the north. Achil Head is one of the highest points in the W. The chief openings are Loughs Foyle and Swilly in the N.; Sligo Bay, Donegal Bay, Clew Bay, Dingle Bay, Mouth of the Shannon, and Kenmare Bay, in the W.; Cork Harbour, Youghal Harbour, Waterford Harbour, in the S.; Belfast Lough, Strangford Lough, Carlingford Lough, Dundalk Bay, Dublin Bay, and Wexford Harbour, in the East.

(4) *Oban*, beautifully situated on a bay, protected by the Island of Kerrara, in the Firth of Lorne. A great centre for the excursion traffic during the summer months to the Western Highlands and islands.

Dundee, on the wide estuary of the Tay, east coast of Scotland, noted for its manufactures of jute, linen, and hemp, and as the chief British centre for the whale fishery.

Aberdeen, a city and port at the mouth of the Dee, east coast of Scotland, built of granite, which is largely found in the neighbourhood; noted for its University, and its manufacture of tweeds.

Port Jackson, an inlet of New South Wales, Australia, forms an excellent natural harbour. Sydney, the capital, stands on its southern shores.

Brisbane, a town on a river of the same name in the south of Queensland, of which it is the capital. Has a population of about 35,000.

New Westminster, situated some distance up the Fraser River in British Columbia. Chief industries, coal mining and salmon fishing.

Ottawa, capital of the Dominion of Canada, on the river Ottawa, a tributary of the St. Lawrence, at the junction of the Rideau Canal and the Ottawa. Is a well-built city, and the chief centre of the lumber trade.

(5) Manitoba,
May 1st, 1888.

My dear Friend,

Our long winter has now passed, and the spring, or rather the summer—for there is very little spring—has burst upon us all at once. The winter has been occupied in cutting timber, in making comfortable the log house which we had just time to erect before the snow fell. Now we are hard at work with the virgin soil. The presence of the stumps of trees and their roots makes ploughing a difficult task. We are at it early and late. There is no time for idling, for upon our work this spring will largely depend our future success. We have already got several acres cleared, and while some of us are guiding the plough others are following with the harrow and the seed. The heat is much greater than in the old country, and the corn will ripen sooner. When reaped we shall have the threshing to do, and what is the least profitable of all we shall have many miles to take it before we can dispose of it to advantage. However, the population is growing, civilization is extending, and in a few years we may hope to have a branch of the great Canadian Pacific carried along our valley. Our prospects are good, and if you can rough it for a year or two you had better come out here.

Yours faithfully,
HENRY FARMER.

History.

BOYS AND GIRLS.

(*Answer two questions only.*)

1. Who were Athelstan, Ethelred, Edmund, and Harold? What are the principal facts known concerning them?

2. Explain the terms Witan gemot, Sheriff, Alderman, and Hundred.

3. Give some account of the invasions of the Danes.

4. Name some places in the neighbourhood of your school or home, associated with early English history before the Conquest, either by name or by history, and give some explanation of such name or historical event.

(1) Four Saxon kings of England. The facts known are as follows:—

Athelstan (925—940) was the eldest son of Edward the Elder. He defeated the Danes at Brunanburg, 937, and annexed Northumbria. He also subjugated West Wales (Devon and Cornwall). Some historians speak of him as 'the first King of England.'

Ethelred (979—1016). The Unready. Adopted the expedient of buying off, instead of fighting, the Danes. He imposed Danegelt for the purpose. In 1002 he ordered a general massacre of the Danes in England. Among others, the sister of Sweyn, King of Denmark, was killed. Sweyn then ravaged England, and Ethelred fled to France. He returned at the death of Sweyn, but died in 1016.

Edmund (1016). Son of Ethelred the Unready. After several battles he shared the country with Sweyn's son Canute, but reigned only seven months, when all England came under Danish rule.

Harold, eldest son of Godwin, Earl of Kent, called to the throne by the Witan on the death of Edward the Confessor. Immediately on his accession he had to repel an attack by Harold Hardradu, King of Norway, and his brother Tostig, whom he defeated and slew at Stamford Bridge, in Yorkshire. He was summoned south to meet William, Duke of Normandy, whom he met at Senlac, near Hastings, but was defeated and slain, 1066.

(2) The Saxon *Witan-gemot* (Assembly of wise men) consisted of the Bishops, Abbots, Earls, Aldermen, and the Danes of superior rank. It was convened at Christmas, Easter, and Whitsuntide. It elected the king, had the power of making laws, concluding treaties, levying taxes, raising land and sea forces, and carrying on the government of the country generally. It was an aristocratic body, the common people having in it no representative.

Sheriff is a corruption or contraction of *shire-reeve*. His duties were executive, he being the chief officer of the shire-mote, the county court of justice.

An *alderman* was a Saxon noble of the highest grade, ranking next to royalty. To the eorls the executive government was entrusted.

Hundred: a division of a county (consisting probably of a hundred free families) having a court of its own with a general jurisdiction over all the affairs of the district.

(3) The Danes were piratical sea-rovers from Norway, Sweden and Denmark. They ravaged the coasts of the North Sea, and before the reign of Egbert was ended took up their winter quarters on the south coast of England. In 871 they murdered St. Edmund king of East Anglia. Ethelred and Alfred defeated them at Ashdune in Berkshire, and for several years swarms of them continually invaded the country, meeting with varying success. In 876 Alfred made peace with Guthrum and his Danes, who swore to leave the island, but broke their oath, and took Exeter. In 877 Alfred drove them into Mercia, but they returned next year and compelled him to flee to Athelney. He afterwards defeated them with great slaughter at Westbury. Peace was then concluded, and the Danes were confined to the East of England. In 893 there was another invasion. Edred curbed the Danes who often rebelled by placing garrisons with English governors in their chief towns. Ethelred II. more unwisely tried to buy them off, and failing massacred them, this conduct resulting in his banishment from the kingdom, and the succession of Sweyn, Canute and Hardicanute, Danish princes, to the throne. After the death of Hardicanute the English regained their liberty, and England was scarcely troubled with the invaders afterwards.

(4) [This question involves a variety of answers, according to the district from which the pupil teachers may come. The following is an answer supposed to be given by a pupil teacher in the north of England.]

The district of the Tyne is rich in memorials of the early inhabitants of Britain. On the south, one of the chief Roman roads is found leading over the Fells to Shields. On the road is Chester-le-Street, a town with a name little altered from that given to it by the Romans, while its church is named after St. Cuthbert, the great propagator of Christianity in the north of England. In Shields there are numerous remains of an extensive Roman camp, while in Jarrow there are the remains of the monastery in which Bede spent his life, and in Gateshead one of the churches founded by Aidan and St. Cuthbert. Another Roman encampment was situated at Ebchester (*castra*, a camp), on a tributary of the Tyne. Crossing the river, the district from near the mouth of the Tyne at Wallsend to Carlisle, the remains of the Roman wall, with numerous stations, mile castles, camps, bridges, altars, &c., are found, while the old military way and the vallum are in good preservation. Some of the names are indicative of their origin.

Needlework.

(*One hour allowed for this exercise.*)

Cut out in calico a doll's pinafore (cottage shape). Fix and make it up as far as time will allow.

Composition.

[The passage was read *once* distinctly, and then the substance of it had to be written down from memory.]

A gentleman in India was saved from a tiger by the presence of mind shown by a native hunter. They were walking home one evening, when suddenly they found themselves within twenty yards of an enormous tiger, which was eating a wild hog. The brute raised its head, covered with blood, and looked at them with its terrible green eyes.

The gentleman raised his gun, about to fire; but the native hunter held his arm firmly down, and kept as still as a statue, with his eyes fixed upon the tiger. It growled and showed its teeth, but gradually let go its prey; then, as if frightened by the steady gaze of the native, it turned slowly round, and giving a sulky growl, slunk away into the long grass. No sooner was its back turned than the native, putting his hands to his mouth, uttered a wild yell, and in a moment the tiger fled in fear.

(To be continued.)

Publications Received.

BELL, G., & SONS.—Examples for Analysis (*F. Edwards*).

BLACKIE & SON.—Shakspere's Hamlet, with Notes; Layng's Euclid, Book 4: Books I. to IV. Prizes: The Missing Merchantman (*Harry Collingwood*); Quicksilver (*G. M. Fenn*); Jasper's Conquest (*Lysaght*); The 'Saucy May' (*Henry Frith*); Meg's Friend (*Alice Corkran*); Shakespeare's King Lear (with Notes): Poynter's South Kensington Drawing Books, 1, 2, 3 and 4.

BURNS & OATES.—Practical Geometry for Science and Art Students (*Carroll*).

CLARKE, JAMES, & CO.—The Royal Commission on Education (*J. Hirst Hollowell*).

CHAMBERS, W. & R.—Chambers's Expressive Readers, Books I and II.

DAWSON, A. G.—Standard Teaching Helps, Part II., Standard 5 (*Major*); The University and Civil Service Arithmetical Examiner (*Beard*); The Teacher's Syllabus Book of Work.

HEYWOOD, JOHN.—The Christmas Carol of Prophecy; Lange's Guide to French, Part I., and Key; Music—Green Leaves, Nos. 1, 2, and 3 (*Clarkson*); A Review of the Day Industrial School Question (*Newbold*).

HOULSTON & SONS.—The Beautiful Valley Series of Sermons to Children, Nos. 7 and 8 (*Rev. J. Bruster*).

JOHNSTONE, A.—Illustrations of the Locomotive Engine: No. 1, Locomotive. No. 2, Working Parts.

LEDSHAM, J. B.—Elementary Mensuration (*Willis*); Algebra, Part I. (*Cormack*); School Staff Book; The Schoolmaster's Yearly Note Book.

LONGMANS & CO.—Theoretical Mechanics (*Taylor*); Animal Physiology (*Furneaux*); Longmans' Drawing Books, Nos. 1 to 12.

MACMILLAN & CO.—French Composition—First Course (*Eugène Fasnacht*).

MURBY, T.—A new Course of Experimental Chemistry (*Castell-Evans*).

MURRAY, JOHN.—The Invisible Powers of Nature (*E. M. Caillard*).

NELSON, THOS., & SONS.—Prizes: Eagle and Dove (*M. E. Clements*); Dulcie and Tottie (*Evelyn Everett-Green*); Favourite Bible Stories for the Young; Out in the World; The Academy Boys in Camp (*S. F. Spear*); The Children's Treasury; Morning and Evening; Bow-Wow; Seaside Pictures and Stories; Pussy-cat Stories; Saved by Love (*Emma Leslie*); The Children's Champion (*Lucy Taylor*); Little Miss Wardlaw (*Louisa M. Gray*); Lionel Harcourt (*G. E. Wyatt*).

THE CLARENDON PRESS.—Cornelius Nepos (*Oscar Browning*); Easy Passages for Translation into Greek (*Sargent*).

UNIVERSITY CORRESPONDENCE COLLEGE.—Matriculation Directory, No. 4; A Translation of Xenophon's Oeconomicus; Milton's Sonnets.

WESTMINSTERIANS all over the world will regret to hear that Mr. Mansford, the esteemed Vice-Principal of the Training College, Westminster, has been compelled, owing to failing health, to relinquish his post. For about 40 years he has identified himself with the interests of the College, and the signal and invaluable services he has rendered the Wesleyan Education Committee entitle him to a well-won niche of honour in the old familiar halls.

In wishing Mr. Mansford the joys of health back again, years of happy quiet, and a green old age, we feel sure we but echo the sentiments of a vast army of teachers scattered in all lands wherever our mother tongue is spoken.

⁂

Le Roi est Mort! Vive le Roi!—Seldom have the authorities at Westminster—represented, we presume, by Dr. Rigg—shown sounder judgment than in the selection of Mr. Mansford's successor. Upon worthier shoulders the honour could not have fallen. Our own readers will learn with peculiar pleasure that the new Vice-President is none other than Mr. Henry A. Reatchlous, M.A., B.Sc., who from time to time enriches these pages with his contributions.

Mr. Reatchlous is no carpet knight. He has won his spurs in the tented field. Entering the profession comparatively late in life, he has, by dogged perseverance, indomitable energy, and sheer pluck, come to the fore front.

His wide and generous sympathy with young men, and his experience during the past decade, pre-eminently qualify him for his new post. We feel confident that no guests will be more welcome at Westminster than old students who re-visit their *Alma Mater*.

May the Vice-President and his charming wife long live to do the honours on these occasions!

Publications Reviewed.

PRIZE BOOKS.

Messrs. Blackie and Son's List.

In noticing Messrs. Blackie's books it is hardly necessary to say that the 'get up' is faultless. The various volumes make their appearance in handsome bindings.

(1) **The Cat of Bubastes.** By G. A. Henty.

An admirably written story of ancient Egypt, full of interest and information. Sure to charm young folks. Eight full-page illustrations are contributed by J. R. Weguelin.

(2) **Captain Bayley's Heir.** By G A. Henty, with twelve effective full-page illustrations in black and white, by H. M. Paget.

A captivating tale, in which the real hero has, through another's treachery, to leave England under suspicion of being a thief. Virtue and honesty, however, enable him ultimately to return home wealthy and to prove his innocence.

(3) **The Lion of St. Mark.** By G. A. Henty.

To say that a book has been written by Mr. Henty is enough to recommend it; to say that it is one of the *best* books he ever wrote is to stamp it with the hall-mark of success. From start to finish 'The Lion of St. Mark' is of thrilling interest. It portrays the adventures in Venice of an English boy, who by manly and brave conduct wins glory and success. Gordon Browne's name is a guarantee that the illustrations are worthy of the text. Indisputably one of the best boy's books of the season.

(4) **The Brig Audacious.** By Alan Cole.

A capital story of the sea and its perils, well printed, illustrated, and published at a reasonable price.

(5) **Under Hatches; or, The Adventures of Ned Woodthorpe.** By F. Frankfort Moore.

Gives an exciting account of life on board a convict ship. Unless we are greatly mistaken this will prove one of the most successful books for boys issued for many a day. The illustrations are models of what such pictures should be, and reflect the highest credit on the limner—A. Forestier. By the way, Frankfort Moore should be heard of again.

(6) **Under False Colours.** By Sarah Doudney.

This story begins in the school house where two girls eighteen years of age have a freak to change places, one girl, Cissy, comes from India, and none of her rich English friends know her personally. She is delicate, and insists upon her schoolfellow—a bright, strong girl, called Cherry—taking her place as visitor at a rich friend's. The step once taken they cannot draw back, and Cherry's life becomes more and more thickly entangled as time goes on. All however ends happily after much suffering and misunderstanding.

(7) **Edwy; or, was he a Coward.**

A good story for boys, showing how through thoughtless bullying they often inflict severe suffering on weaker and more nervous children.

(8) **Hugh Herbert's Inheritance.** By Caroline Austin.

A widow and her family are overtaken by misfortune This nerves the boys and girls to do brave battle with the world. With what success they meet, young folk should find out for themselves, by reading the book.

(9) **Jasper's Conquest.** By Elizabeth J. Lysaght.

The story of a violent-tempered boy's trials; of how he tries and finally succeeds in governing himself.

(10) **Joan's Adventures.** By Alice Corkran.

A delightful little story book about 'The Wizard of the North Pole,' 'Joan's Visit to Want-Land,' and 'The Wizard and his Goose.'

(11) **The Battlefield Treasure.** By F. B. Harrison.

Tells how a boy helped to search for hidden treasure.

(12) **Linda and the Boys.** By Cecilia S. Lowndes.

A pretty story for children, telling how a little girl eight or nine years old cares for her two little brothers, because she has promised her father that she will do so.

(13) **Giannetta—A Girl's Story of Herself.**

The story of a girl who has an inborn love for sculpturing and art, and pursues it through the varying phases of life; first in her mountain home of poverty in Italy, and also when rich, surrounded by all the joys of home life in England.

(14) **The Missing Merchantman.** By Harry Collingwood.

This admirable story tells of adventure by sea of a pirate crew, and of all the delights a boy looks for in a book of sea voyages.

(15) **Quicksilver, or the Boy with no Skid to his Wheel.** By George Manville Fenn.

'Quicksilver' is little short of an inspiration. In it that prince of story writers for boys—George Manville Fenn—has surpassed himself. It would be too tantalizing to our readers to detail the doings of the young ragamuffin hero. Buy the book, and if you wish to gladden the heart of a sick boy, or to make a peace-offering to some young rebellious Turk, post him the copy forthwith. It is an ideal book for a boy's library.

(16) **Meg's Friend.** By Alice Corkran.

A bewitching story of child life, in which the interest never flags.

(17) **The 'Saucy May.'** By Henry Frith. Illustrated by A. Monro Smith.

In this attractive book we have recounted the adventures of a stowaway. Mr. Frith has wisely sought materials and 'local colour' at Yarmouth and Gorleston. The result is a splendid story, which can be put with confidence into the hands of the young.

Fourpenny Books.

(18) **My Cat Timothy, Stories about my Dolls, Toddy, Dorothy's Clock, The Happy Childhood of Two Little Girls, A Start in Life.**

Stories for children of all ages, dolls and fairies for the little ones, and the struggle of a start in life for older boys. All worth reading, and all pretty bindings.

Ninepenny Series.

(19) **The Little Cousin, Shucks, Sylvia Brooks, In Cloudland, Queen of Squats.**

Well written stories, bound in coloured cloth and gold.

Shilling Series.

(20) **(Fairy) Tales from the Russian of Mdme. Kabalensky, Cinderella's Cousin, In the Summer Holidays, Their New Home, Janie's Holiday, How the Strike began.**

All being good tales, one scarcely knows which to choose. 'How the Strike began' is exceptionally interesting.

(21) Self Exiled. A Story of the High Seas and East Africa.

A young lad gets into trouble for helping his fellow students in a Scotch college to create an uproar in the streets. He feels so much the disgrace, that he runs away to sea, and meets with endless adventure and excitement, falling into the hands of mutineers, slave dealers, &c. A book that cannot fail to interest boys.

(22) Swiss Stories for Children. By Lucy Wheelock.

Beautiful stories of goodness and charity, with lifelike descriptions of Swiss homesteads and country.

(23) Storied Holidays. By E. S. Brooks.

Historically true tales of some of our popular holidays and those of other lands. Instructive and amusing.

(24) Filled with Gold. By J. Perrett.

A story showing how the love of gold often leads people into crime.

(25) Little Lady Clare. By E. E. Green.

A beautiful true story, in which an old family feud is healed through the thoughtful kindness of one young lady and her brother.

(26) Mischievous Jack, The Old Violin, Dew, Pet Project, The Twins and the Chosen Treat.

Interesting, wholesome stories, beautifully bound.

(27) When I was a Boy in China. By Yan Phou Lee.

An exceedingly interesting account of Chinese life and homes, with incidents of school life and games. Will be quite as much appreciated by adults as children.

(28) Susan. By Amy Watson.

A pretty story in simple language for little children.

Messrs. Thomas Nelson and Son's List.

We have received from the Messrs. Nelson a batch of Prize Books bound in the usual excellent style of this famous house. Every book in this list can be bought with confidence both by parents, teachers, and guardians.

(1) Academy Boys in Camp. By S. P. Spear.

This interesting little story gives a description of a schoolful of boys setting out for a holiday in the country, where they are to live in camp. One of the party is left behind, because he refuses to tell who has destroyed some books. The actual culprit, however, becomes so unhappy that at the last moment he, with a friend, absent themselves and send a note of confession to the master. Then of course there are great rejoicings over the brave little fellow who refused to tell tales. The offenders are eventually brought to repentance, and publicly declare that they will never again tell a falsehood.

(2) Eagle and Dove. By M. E. Clements.

A beautiful and interesting story of the Franco-Prussian War. A young German girl at school at Metz is unable to get away before the siege. Her brothers and lover are soldiers in the German army, and she suffers much from suspense. Although able to get one or two letters brought by her pet doves, her position in the enemy's country is painful. The whole story will impress some thrilling events of modern history on the minds of boys and girls who are fortunate enough to read the book, and give them a good idea of some of the discomforts and horrors of war.

(3) Out in the World: The Story of Claire Benedict. By Pansy.

In this story the father's death and misfortune come suddenly upon a rich family. Claire, the eldest girl, a brave, strong-willed Christian, takes the burden of cares upon herself. After settling mother and sister in a little home she goes out into the world to earn her living. The scene of the story is in and near Boston, in America, and the force and strong points of an American girl's training are shown to great advantage.

(4) Dulcie and Tottie. By Evelyn Everett-Green.

This is a tale of two little orphans who have been lovingly cared for and taught by maiden aunts. They go to spend some months with rich cousins, in whose home there is very little love. And the little ones are able to prove to their friends that loving hearts and kind deeds are more necessary to happiness in life than any amount of riches.

(5) Favourite Bible Stories.

This is a handsome volume, charmingly illustrated and admirably printed in exceptionally bold clear type. It contains the ever-new stories, 'Joseph and his Brethren,' 'Moses,' 'Ruth,' 'David,' 'Daniel,' and 'The Life of Our Lord Jesus Christ.' It is just the book for a mother to put into the hands of her children, or to read to them on Sunday evenings.

(6) The Children's Treasury of Pictures and Stories.

A delightful little book full of good things for the young.

(7) Bow-wow, Pussy Cat Stories, Morning and Evening, and Seaside Pictures and Stories,

Are four large, handsome, and cheap children's toy books, with coloured illustrations. They have given unbounded delight to our own wee ones.

NOTE.—Just as we go to Press we have received (too late for full notice), from Messrs. Nelson, the following handsomely-bound volumes:—

Lionel Harcourt, or 'Like other Fellows.' By G. E. Wyatt.

Little Miss Wardlaw. By Louisa M. Gray.

Saved by Love. By Emma Leslie.

The Children's Champion, and The Victory he Won. By Lucy Taylor.

Hodder & Stoughton.

Vermont Hall. M. A. Paull.

This temperance story shows that strong drink ruins lives in all classes of society, and brings suffering and poverty in its wake. Some of the scenes are heart-touching, and doubtless will prove a warning to young people against ever forming a taste for drink.

Cassell & Co.

(1) The Black Arrow: A Tale of the Two Roses. By Robert Louis Stevenson.

This tale of love and chivalry is quaint and historical. A young lady dresses in man's costume for safety in time of war. She meets with a travelling companion, and they strike up a friendship, and have no end of adventures and perils to go through long before they realize that they are lovers. After taking part in bloodshed and strife the youth and maiden are willing to give up all honour that is offered them to claim each other's love for life.

(2) Little Folks and Bo-Peep

Are books for the little ones, exquisitely bound and illustrated, and full of beautiful stories in rhyme and prose.

(3) Cassell's Book of Sports and Pastimes

Is a large and strongly-bound volume, full of information about every imaginable game that ever boy or girl played at. It contains also all kinds of directions for the making of toys and articles for amusement. The reading of this book will prove quite an education to boys of a mechanical turn of mind.

W. & R. Chambers.

Great Thinkers and Workers. Selected and edited by Robert Cochrane.

The editor of this handsomely got-up presentation book justly observes that, 'When faithfully narrated, the lives of men eminent in the industrial, commercial, or literary world are full of instruction, inspiration, and stimulus for every one, especially to those entering upon the active duties of life.' He has here given us short, graphic, and what is of far greater importance, *reliable* sketches of Carlyle, Lord Armstrong, Tennyson, Nasmyth, Dickens, Sir Titus Salt, Thackeray, Sir Henry Bessemer, Ruskin, Darwin, Kingsley, Browning, Millais, George Moon, and the builders of the Forth Bridge. The volume is worthy of a place in every boy's library in the kingdom, and has our warmest commendation.

A Short Text Book of Electricity and Magnetism. By Thomas Dunman; revised and completed by Chapman Jones, F.I.C., F.C.S., &c.

This is a re-print from the *Universal Instructor*. The earlier chapters were written by the late Mr. Dunman. The later ones, including those on Recent Applications, were written by Mr. Chapman Jones. These, we are told, were written when electric lighting and allied subjects were engaging the attention not only of experts but of the general public, and hence this part has a greater prominence than it would appear to merit at the present time. This, however, we think is just that part of the book which will be most useful to those who will read the book. Full and accurate descriptions of the rather complicated appliances depending upon electrical discoveries are not always within a student's reach. We can recommend this little book as a trustworthy guide for those who do not want an elaborate and abstruse treatment of the subject.

Drawing Copies for the Standards. By J. R. Ablett. London: Blackie and Son.

We have received seventeen numbers of the new issue of these Drawing Copies. The additions to the series are such as experience has taught to be necessary to make it thoroughly complete. We can heartily commend it to those teachers of drawing who are looking for something suited to their needs.

A Manual of Phonography, or Writing by Sound. By Isaac Pitman. New Edition. London: Isaac Pitman and Sons.

The subject of Phonography received special attention in this journal in a recent notice of several publications of Messrs. Pitman. We need, therefore, do no more at present than call attention to the facts that this edition of the 'Manual of Phonography' has been thoroughly revised after consultation with a large number of experienced shorthand writers, and that, by important additions and the use of a rather larger type, the work has been considerably extended as well as improved.

Times.—'Perfect.'

Standard.—'Very complete.'

THE

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> *Wisdom is humble that he knows no more.*'—COWPER.

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POST FREE, 7½D.

How my School was Examined.

BY THE

HEAD MASTER OF AN ENGLISH SCHOOL.

STANDARD I.

Arithmetic.—1. 202 + 87 + 684 + 61 + 967.
2. 604 − 19.
3. 915 − 186.
Answers.—(1) 2,001; (2) 585; (3) 729.

Writing and *Spelling.*—*World, Nose, Ounce, Cottage, Finger, Hand, Master, Board, Coat, Fall.*

Geography.—Children were asked the meaning of the letters N., S., E., W., marked on plan of school; to point out East side and South side of school; to name the direction of a course taken between these points; to form a word of the letters N., S., E., W. In coming to school this morning where did you observe the sun? In what direction do you never see the sun? Do any people see the sun in the north? Some people may have never seen a map: what would you tell them it was? What is there to be seen on the map? Point to a map in school, give its name (several other names of maps). The course of the Danube taken to point out the beginning. What do these shaded lines represent? (*Mountains.*) How is a river represented on a map? Why is it drawn now out, then in, first up, then down? Will a river run up? What is meant by showing it running up on the map? Which is the largest map in the school? (*England* or *Eastern Hemisphere.*) Why are they made both about same size?

STANDARD II.

Arithmetic.—1. 201,001 + 9,804 + 68 + 14,071 + 497.
2. Divide 75,040 by 11.
3. Take 36,028 from 89,080.
4. Multiply 7,807 by 860.
Answers.—(1) 225,441; (2) 6,821 + 9; (3) 53,052; (4) 6,714,020.

Writing and *Spelling.*—'When pressed with hunger the white bear becomes very fierce, and will then attack any man or beast he meets with. A story is told of some sailors in these regions having once been attacked by three hungry white bears.'

Grammar.—Nouns and Verbs were picked out from Dictation exercise; and questions asked such as follow. Why is 'hunger' a noun? What kind of bear would he be called? (*Hungry.*) What part of speech is 'hungry'? The compound verb 'will attack' to be given as one verb, its parts 'will' and 'attack' taken. What name is given to such verbs as 'will'? What does the verb 'will attack' express the action of? Definition of a verb. 'Having been attacked' were taken as participles. Give an example of 'attacked' used as a verb.

Geography.—What geography has been learnt during the year? (*Size and shape of earth, &c.*) Tell the name of some object which would nearly represent the shape of the earth. (*Orange.*) In what particular parts does the orange correspond in shape with the earth? (*Top and bottom.*) What particular name is given to each of these parts of the earth? What size is the earth? Which is the greater distance, round about it or directly through it? What is the distance through? What particular name is given to the distance round the earth? also, name given to distance through the earth? How many times is the circumference greater than the diameter? By what simple way can we prove that the earth is round? Give the name of a famous Englishman who sailed round the world. Tell the names of any oceans he would cross. Which is the largest of these? What great body of land between the Atlantic and Pacific? Which of the continents are we nearest to? Why are they called continents? Give the names of some countries in Europe. Which county do you live in? Point to the part of England on the map. What particular name would you give to this level country district? What use is a river? What particular name is given to the land drained by a river? Point out a watershed on the map of England. Definition of a cape asked for, and the various other names by which such points may be known.

Mental Arithmetic.—How many halfpennies in 7½d.? Which is the larger, 11 times 12 or 12 times 11? What is 11 times 12? If a boy spends ½d. per day, how much will he spend in a fortnight? If I got 2 eggs for 1½d., what would 4 eggs cost? How many threepences in a two-shilling piece? Half a pound of butter at 1s. 4d. per lb. What is the half of 11? How much is 38 pence, 60 pence, 60 halfpennies?

Standard III.

Arithmetic.—Boys.—1. Add together £371 10s. 6¾d. + £4,626 12s. 3½d. + £271 8s. 4¼d. + £34,231 11s. 2d. and 4½ guineas.

2. Subtract 19 times 190 from a quarter of a million.

3. Take £422 6s. 4½d. from £6,701 0s. 3¼d.

4. In 15 houses there are 26 windows, with 12 panes in each window; other 9 houses have 15 windows, with 6 panes in each. How many panes are there in the 41 windows?

Girls.—1. Add together £76,809 14s. 5½d. + £806 0s. 6¼d. + 6½d. + £567 15s. 3¾d. + 16s. 11¼d.

2. Divide half a million by 987.

3. A woman bought 10 pairs of boots at 10s. per pair, and sold them for 5½ guineas; how much did she gain by the transaction?

4. Bought 5 pennyworth of nuts at 12 a penny. 1 out of every 10 were bad. How many bad ones in the lot bought?

Answers.—Boys. (1) £39,505 16s. 10½d. (2) 246,390. (3) £6,278 13s. 10¾d. (4) 402.

Girls. (1) £78,184 7s. 9¼d. (2) 506 + 578. (3) 15s. 6d. (4) 6.

Writing and Spelling.—'Dreadful scenes were sometimes witnessed. Fathers followed the dead-carts which contained the remains of their families, and moaned with grief and pity when they saw how rudely they were thrown into the grave and put out of sight. Even more dreadful was the case of those who sought to drown their fears in drinking.'

Grammar.—Parts of Speech were taken from the Dictation Exercise.

What is the singular of 'scenes'? Give me another word meaning much the same as 'scenes.' (*Scenery.*) What kind of a noun would you call 'scenery'? Why? Name any other abstract nouns you notice in this piece. What is a pronoun? What noun is 'their' used instead of? What pronoun would you use for the singular? What case are these pronouns in? Make a sentence of your own containing the word 'witnessed.' Does it refer to the present time or past? What would we say if it referred to the present time? What other part of speech may the word 'witness' be? Give an example. What kind of an adjective is 'dreadful'? What degree of comparison? To express it in its highest form what would we say? Why do we say 'more dreadful' in the line 'Even more dreadful was the case of those who sought to drown their fears in drinking'? What is the use of 'more'? What kind of adverb? Name as many kinds of adverbs as you can. Give an example of a sentence containing an adverb of Time.

Geography.—How many counties are there in England? How many in Wales? Each child in turn name a Welsh county. What river separates Cardigan from Pembroke? Name a river in North Wales. What particular name is given to the whole of the Welsh Mountains? Meaning of the word Cambrian. Name some of the highest mountains. Meaning of Cader Idris. What are the chief occupations of the people of Glamorganshire? From what seaport in this county is coal sent? Passing by rail from Carnarvon to Anglesea, what piece of water is crossed? This is a branch of what railway? Which is the largest river in Wales? Name another Welsh river rising near the source of the *Severn.*

Mental Arithmetic.—How many sixpences in 7s. 6d.? In one pound of tea there are 16 ozs.; how many in quarter of a pound. Divide 5s. among 60 children; how much for each? 1½ doz. eggs at 2 for 2d. A boy saves 2s. 6d. per week; how much will he have saved in 8 weeks? Bought eggs at 4 for 6d.; how much is that each? I have 100 oranges; how many more should I want to give 40 children 3 each? In a month's holiday how many school days are missed? Bought ½ lb. of coffee at 1s. 8d. per lb., and ¼ lb. of butter at 1s. 4d.; how much change ought I to receive out of half a crown? How much is 16s. 4d. short of a sovereign? If I share one pound among six girls how much would they each receive?

Standard IV.

Arithmetic.—Boys.—1. Divide £10,124 by 311.

2. Bought 60 lbs. of butter at 1s. 5d. per pound. Half was sold at 1s. 6d. and the remainder at 1s. 8d. per pound. What was the profit?

3. Fifty men earn 2s. 6d. each; 50 women earn 1s. 3d., and 50 children 7½d. each per day; what were the total earnings per day and per week?

4. Reduce 8 acres to half inches.

Girls.—1. Reduce 132 yards, 1¼ feet, 7 inches, to inches.

2. Multiply £1,058 16s. 8½d. by 1,080.

3. Divide £8,604 8s. 9¾d. by 68.

4. ¾d. is gained on every 4 ozs. of tobacco sold. How much will be gained on 7½ lbs.?

Answers.—Boys: (1) £32 11s. 0½d. + 290; (2) 10s.; (3) £10 18s. 9d. per day, £65 12s. 6d. per week; (4) 100,362,240 half inches.

Girls: (1) 4,777 inches; (2) £1,143,542 5s.; (3) £126 10s. 8½d. + 31; (4) 1s. 10½d.

Grammar.—Parse, as fully as you can: 'From Flodden ridge the Scots beheld the English host.' Conjugate the verb 'beheld' in the Imperative and Potential Moods.

Mental Arithmetic.—How many quarters in 2½? Multiply 30¼ by 8. 4½ times 20. 1¾ lbs. of beef at 8d. per lb. What is ⅙th of a sovereign? What is ⅜th? How many pint tins can I fill out of a gallon and a half of milk? Apples are sold 10 a penny; how many for a half-a-crown? How many half stones in a hundredweight? What part of £1 is 5s.? What is the half of a guinea?

Standard V.

Arithmetic.—1. Add together $\frac{1}{4}+\frac{7}{8}+\frac{1}{2}+\frac{1}{8}$, and subtract $\frac{9}{20}$ from the total.

2. If 34 hats can be bought for £48 9s. 6d., how many can be bought for £145 8s. 6d.?

3. Make out and receipt the following bill:—
54 sheets of artists' canvas at 6s. 4d. each.
2,000 sheets cartridge at 5s. 4d. per 100.
6 boxes of colours at 2s. $9\frac{1}{4}$d. each.
49 framed etchings at £12 10s. each.
2 doz. camel hair brushes at 12s. a gross.

4. A chemical factory consumes 13 tons of coal in a week at the rate of 9s. 4d. per ton; what would be the cost of coal consumed in $1\frac{1}{2}$ years?

Answers. (1) $1\frac{41}{120}$. (2) 102. (3) £17 2s. + £5 6s. 8d. + 16s. $7\frac{1}{2}$d + £612 10s. + 2s. = £635 17s. $3\frac{1}{2}$d. (4) £473 4s.

Grammar.—What is a sentence? Parse and Analyse fully: 'The Scots beheld the English host Leave Barmore Wood, their evening post.' What do you understand by analysis? What is the case of 'post' in the above sentence? What do you mean by apposition? Give an example of your own of a sentence containing a noun in apposition. Form adjectives from the following and give examples of sentences containing them—*horizon, society, people.*

Mental Arithmetic.—Add $\frac{1}{5}$ and $\frac{1}{6}$. What is a multiple? Tobacco at 4d. per oz., how much would be paid for a stone? Take $\frac{1}{4}$ from $\frac{2}{3}$. How many $\frac{1}{20}$ in 2? 15 pairs of ducks at 1s. each. A schoolroom window has 10 panes in length and 8 in breadth, how many panes in the square surface of window? What must be added to $\frac{4}{5}$ of a pound to make a sovereign?

STANDARD VI.

Arithmetic.—Boys.—1. If $\frac{7}{8}$ of a ton cost £22 15s. 0d. what would $\frac{12}{13}$ of a cwt. cost?

2. Divide ·00270 by 3·01.

3. If a man travels 312 yards in $\frac{1}{2}$ min., how far would he travel in $31\frac{1}{2}$ minutes?

4. A postage stamp is 1 inch in length, and 3 stamps side by side would measure 4 inches; how many square inches will 10s. worth of stamps cover?

Girls.—1. Bring 2·0625 to a vulgar fraction and multiply the answer by $\frac{2}{3}$.

2. Add together $\frac{1}{3}$ of 5s., $\frac{1}{60}$ of £1, $\frac{3}{12}$ of 7s. 6d., and $\frac{2}{3}$ of £1.

3. If ·6125 of a pint is filled 40 times from a cask containing 48 gals., how much of the liquid is there left?

4. Gold-leaf costs $4\frac{1}{2}$d. per inch; what will 32 inches long by $\frac{3}{4}$ in. broad cost?

Answers.—Boys: (1) £1 4s. (2) ·000897+. (3) 19,656 yds. = 11 mls. 1 fur. 13 p. $4\frac{1}{2}$ yds. (4) 1 sq. ft. 16 sq. in.

Girls: (1) $1\frac{3}{8}$. (2) 17s. $2\frac{1}{2}$d. (3) 44 gals. 3 qts. 1 pt. 2 gills. (4) 9s.

Composition.—Write out all you can about the life of Her Majesty Queen Victoria.

Grammar.—What do you understand by a Complex Sentence? What name is given to the dependent parts of these sentences? Give an example of a Noun Sentence, Adjective Sentence, and Adverbial Sentence. Name any particular kinds of these latter sentences. Name the various forms of the Latin prefix *Ad*, meaning to. Give examples of words containing these, and show how the meaning of the word agrees with the meaning of the prefix.

Mental Arithmetic.—What is 6 times $\frac{1}{8}$ of sixpence? ·25 of 20s.? What vulgar fraction is equal to ·75? ·125? How many times is ·125 less than ·25? What is the interest on £400 for 6 months @ 4 %? $\cdot\dot{3}$ of 9s. is how much? Divide 12s. between A and B, giving A 3s. more than B. What is B's share?

STANDARD VII.

Arithmetic.—1. Find the simple interest on £960 for 3 years 219 days at 5 per cent. per annum.

2. Simplify.
$$\frac{\frac{1\frac{2}{5}}{3}+\frac{4\frac{2}{3}-1\frac{1}{8}}{2\frac{1}{4}}-\frac{2\frac{1}{3}}{5}}{17}$$

3. In a town of 5,000 people 75 died in one year. What was the percentage of deaths in that town?

4. A grocer sold 9 lbs. of cheese for what 15 lbs. cost. Find gain per cent.

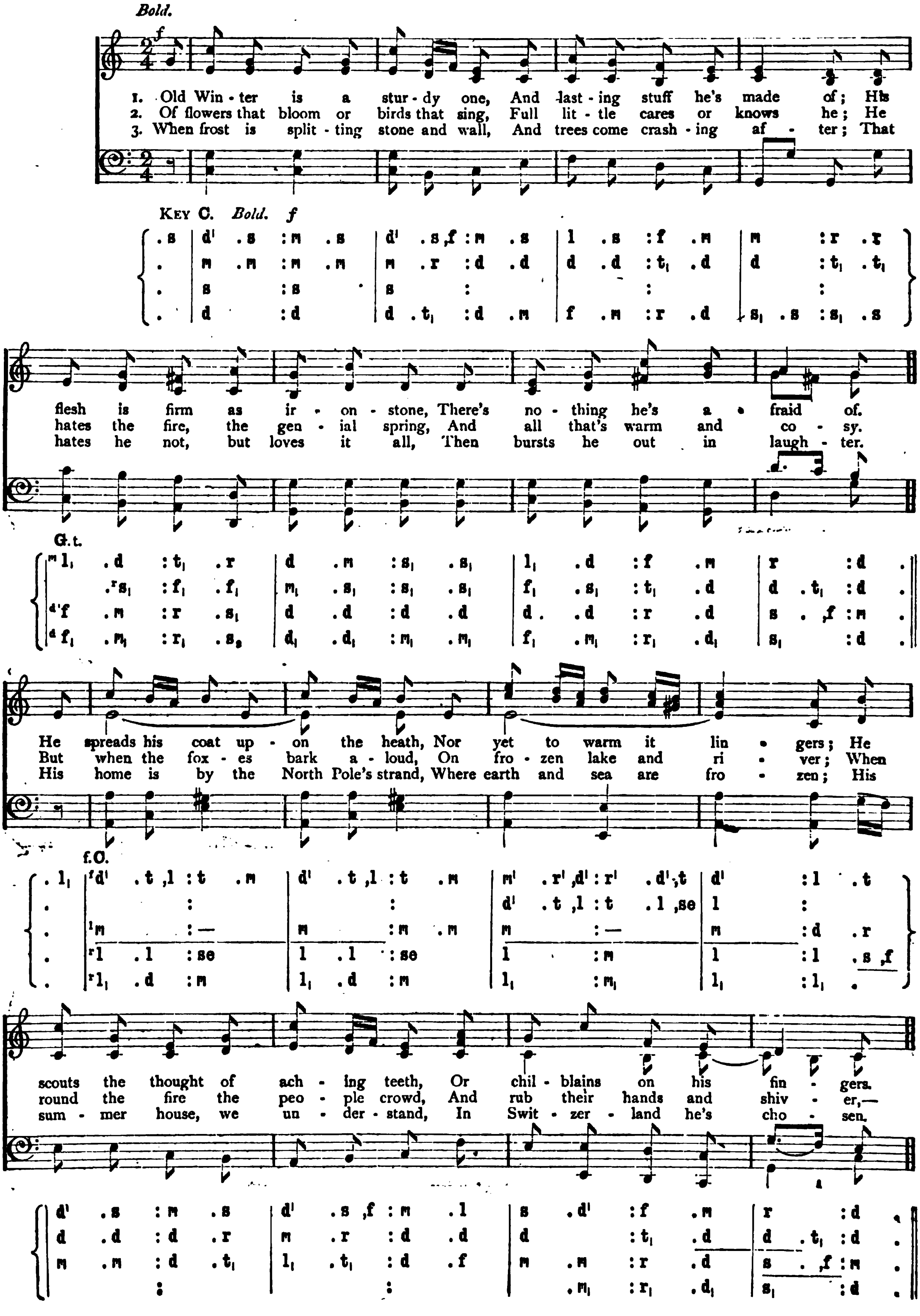
Answers.—(1) £172 16s. (2) $\frac{5}{54}$. (3) $1\frac{1}{2}$ per cent. (4) $66\frac{2}{3}$ per cent.

Composition, *Grammar*, and *Mental Arithmetic* same as Standard VI.

STANDARDS IV. TO VII.

Geography.—What important town have you near to the Forth? What is the seaport for Edinburgh? Name another seaport near to Leith. Sailing up the Forth, what town have you in the vicinity of the Ochil Hills on the south bank of the river? What Scottish patriot has a monument on the slopes of the Ochils? What famous spa or watering-place is there at the foot? What tributary enters the Forth near Stirling? Following this river to its source, what places of interest have we on its banks? On reaching Culloden, what famous romantic district are we at the entrance of? Name a few lakes and mountains in this district. What Scottish poet has made this part famous? Proceeding down Loch Lomond towards the Clyde, what county should we eventually pass through before reaching this great river? Name an arm of the sea forming a part of the Firth of Clyde. Name the island county in the Firth of Clyde. What famous sea-side town is in Bute? Name any other place of interest in the island. Leaving Glasgow for America by steamer, what Irish town would you call at? In what county is Coleraine? On what river does it stand? What province is the county a part of? Name the capital of Ulster. What is the chief occupation of the people here? What province is in the West of Ireland? What river separates this province from Leinster? At the mouth of the Shannon what seaport is there? In which province is Limerick? In what part of Munster is the lake district situated? Name a river rising in county Kerry. What seaport stands at the mouth of the Lee? Crossing the Atlantic, what important seaport in Nova Scotia would a steamer probably call at? What arm of the sea separates Nova Scotia from New Brunswick? What river in New Brunswick flows into this bay? Which is the principal town in this province? Name an island province off the coast. In what large opening is it situated? What is the great business town on the St. Lawrence? What railway passes through the town? What province does it enter on crossing the river? When Ottawa is reached, what province is entered?

OLD WINTER.


Bold.
1. Old Win - ter is a stur - dy one, And last - ing stuff he's made of; His flesh is firm as ir - on - stone, There's no - thing he's a - fraid of.
2. Of flowers that bloom or birds that sing, Full lit - tle cares or knows he; He hates the fire, the gen - ial spring, And all that's warm and co - sy.
3. When frost is split - ting stone and wall, And trees come crash - ing af - ter; That hates he not, but loves it all, Then bursts he out in laugh - ter.
Key C. Bold. f
G.t.
He spreads his coat up - on the heath, Nor yet to warm it lin - gers; He scouts the thought of ach - ing teeth, Or chil - blains on his fin - gers.
But when the fox - es bark a - loud, On fro - zen lake and ri - ver; When round the fire the peo - ple crowd, And rub their hands and shiv - er,—
His home is by the North Pole's strand, Where earth and sea are fro - zen; His sum - mer house, we un - der - stand, In Swit - zer - land he's cho - sen.
f.C.

Notes of a Lesson on the Movement of the Earth causing Day and Night.

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EXPERIMENTS AND THE TRUTHS THEY TEACH.

A. Experiment with a lamp and ball.

Place a lighted lamp on a table. Then take a large ball and enclose the half of it turned away from the lamp in a paper screen in the form of a cylinder.

Turn the ball round slowly until a point A returns to its first position opposite the light.

Results to be observed and stated:—

One half of the ball is always in the light and one half in the dark.

Every point on the surface of the ball is in turn half its journey round in the light, and half in the dark.

B. Repetition of the above experiment by means of the globe and a light, in explanation of the recurrence of Day and Night.

1. Take an ordinary terrestrial globe and hold it in front of the light. The scholars are to imagine that the light is the sun and the globe is the earth. The following truth is in this way illustrated and should be stated, viz.:—

That one half of the globe is in the light and this protion represents Day; the opposite half of the globe is in the shade and this portion represents Night.

2. Turn the globe slowly round until the point directly in front of the light returns again to the same position. The globe has rotated once and as a result it should be evident to the class that:—

Any place on the rotating globe travels half round in the light, *i.e., in the Day,* and half round in the dark, *i e., in the Night.*

ILLUSTRATIONS AND HOW TO USE THEM.

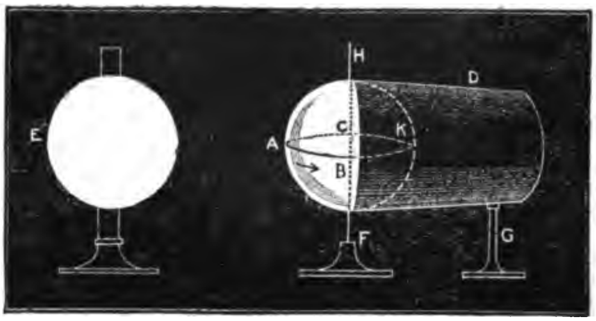


Fig. 1. Sketch of a simple model designed to perform experiment 1.

E is an ordinary lamp.

A is a ball about the same size as the globe of the lamp.

D is a paper screen representing the shadow which covers one half of the ball and stretches away behind it.

F and **G** are wire mounts. They hold the ball and the screen in position and allow the teacher's hands to be free to turn the ball by means of the extended wire at **H.**

N.B.—This lesson is often spoiled by the teacher attempting to hold his apparatus in his hands whilst giving the lesson.

The results ought to be stated by the class in answer to questions. If the class cannot state them the experiment must be repeated until they are known and stated.

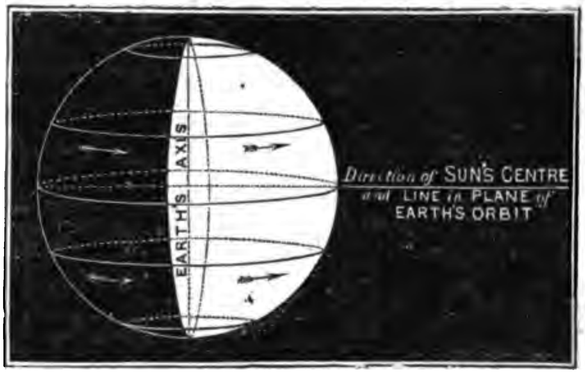

EARTH'S AXIS
Direction of SUN'S CENTRE and LINE in PLANE of EARTH'S ORBIT

Fig. 2. A globe held before a light to show the light and the dark parts respectively.

Then slowly rotated to illustrate the change from night to day and *vice versa.*

This is a slight variation of experiment 1. Only slow progress must be expected in this lesson, and only by a series of graduated experiments such as these can the class be led to grasp the movements of the earth, which on account of their magnitude are beyond the actual observation of the learner.

The truths taught are not perfectly grasped until they can be stated in the scholar's own words.

C. The beginning, end, and course of a point on the globe in the light and the dark respectively.

1. Select a point on the dark half of the globe and then slowly rotate towards the lighted portion of the globe. The class to watch carefully and state when the light is first seen from the point selected.

2. Turn the point round in the same direction until the light is ready to disappear. The class, or some member of it, to state when the light becomes hid from view.

3. The course over which the point has been carried from the position where the light became first visible to that where it disappeared is the light or *day* course. Thence round again to the light is the dark or *night* course.

D. Application of the above truths in explanation of the chief phenomena of Day and Night.

1. *Apparent movements.*

The sun rises every morning in the east, passes across the heavens and then sets in the west. **The progress of the sun over the sky from rising to setting forms the Day.**

After the sun has set in the west, darkness begins and continues until the sun reappears the following morning in the east; **this interval of darkness forms the Night.**

2. *Real movements causing Day and Night.*

The earth by its rotation causes the sun to rise and to appear to cross the heavens and then to set in the west, and this movement of the earth **causes the recurrence of Day and Night.**

E. Terms and Definitions.

1. *Diurnal movement* is the name given to the rotatory motion of the earth which causes Day and Night.

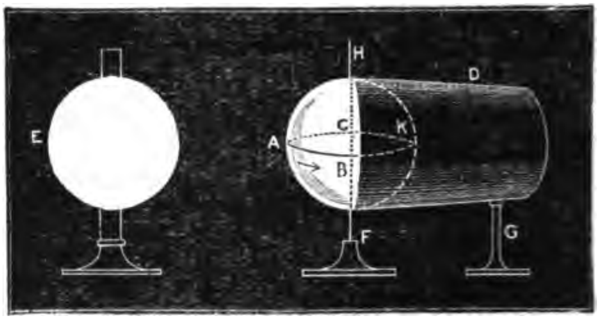


Fig. 3. Use again the model first presented to the class.

Direct attention to K. As this cannot be seen on account of the screen, its position may be noted by means of a diagram like the above drawing made on the blackboard.

1. Bring slowly the point K from beneath the screen to C, where the light first becomes visible.

Repeat this operation by allowing different scholars to turn the ball by the wire at H until the letter K marked on the ball comes into the light.

2. Similarly allow members of the class to rotate the ball until various points selected by themselves are brought to the position where the light disappears.

3. Then allow others to take a place through the entire light course; and similarly through the dark course.

The scholars observe these apparent movements many days in the year, and although they may not be able to give reasons for them they will state the facts in reply to the teacher's questioning.

The children must be encouraged to state their notions of a complete day and night in their own words, the teacher should only perfect their statement when the notions are evidently grasped. Full statements such as those on the left may afterwards be written on the board and repeated by the class.

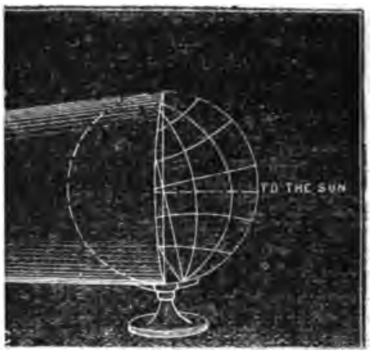


Fig. 4. A globe half enclosed in a screen to be used in the same way as the ball in Fig. 3. The scholars to indicate positions at which the sun is *rising* and *setting*, also where it is *midday* and where on the globe it is *midnight*.

By contrast with a globe that is stationary bring out the notion that in order to cause the sun to rise and set at any place the globe must rotate.

2. *Axis.* In rotating a ball or globe there is a line running through the sphere which does not move. **This line of no movement is the axis.**

3. *Poles.* The ends of this axis are termed the North and South Poles respectively.

Supply the term for this rotatory movement and show the position of the **axis** and of the **poles.** The class should be encouraged to attempt simple definitions of each term.

BLACKBOARD SKETCH.

1. A sphere or ball when turned towards the light has one half its surface **in the light**; the other half is **in the dark.**
2. By rotating the ball every place in turn is half its journey in the light and the remaining half in the dark.
3. Similarly a globe representing the earth may be shown to be half in the light and half in the dark, and by moving the globe round, every place moves half its course in the light and half in the dark. **The light course represents the Day, the dark course the Night.**
4. The sun appears to rise, to cross the heavens, and to set.
5. These appearances are due to the earth rotating once every twenty-four hours.
6. This rotatory motion is called the **Diurnal movement.** The line of no movement is called **the earth's axis. The ends of this axis are the poles.**

How a Scotch School was Examined.

After looking over the log-book and reading the last report, H.M. Inspector asked for a list of the school songs, of which a list of seven, besides several rounds, was placed in his hands. Previous to singing two songs, one of which was selected by him and one by the children, a Modulator Exercise, a Time Exercise, and an Ear Test, were given.

Modulator Exercise for IV., V., and VI.:—Key C. **f r fe s t l se l d t l d ta l t r^1 d f fe s m l_1 t r d s m r l r d.**

That given to II. and III. was easier, no semi-tones being asked.

Voluntary Ear Test on School Harmonium:—**d m r d; f l s m; r f r d; d^1 s m d; r d t_1 d.**

Time Test.—

| 1 :— :1 | — :— :1 | 1.1 : 1.1 : 1 | — :— :1 }

| 1.1 : — :1 | 1 :- .1 : 1 | 1 :— :— ‖

Infants and Standard I. sang together an easy exercise on Modulator:—**d r m d m s d f l d r d s m d m d.**

One song was asked from Infants and one from Standard I.

Infants.

While these were being examined the higher Standards were allowed to go out to the playground under charge of the pupil teachers.

1st Class of Infants read a sentence from Blackie's Graded Primer II. and spelled a word round; with a few easy questions on matter read.

Writing.—Wrote their names and the name of the village they belonged to, as well as a few easy words to dictation—*e.g.*, father, mother, sister, brother.

Arithmetic.—Numbers, such as 20, 19, 17, 15, 9, 10, were dictated to be put down on slates. Mental Arithmetic: 9 + 5? 19 + 5? 7 + 6? 17 + 6? 27 + 6? 3 + 5? 13 + 5? 23 + 5? &c., 7 − 3? 17 − 3? 27 − 3? 15 − 9? 25 − 9? &c., 7 and 3 and 2? 8 and 4 and 5? &c.

2nd Class read from Blackie's Graded Primer I. one sentence, or one line each.

Writing.—Inspector asked for the name of a child beginning with C, and Cameron being given, the class was asked to write these capitals—C A M E R O N.

Arithmetic.—7 + 3? 4 + 5? 7 + 4? 4 + 5? &c., 7 − 2? 10 − 3? 9 − 5? &c., individually and collectively.

3rd Class read from Card and were jocularly questioned about the 'pig' and the 'dog' that ran at the 'pig.'

Writing.—They were asked to write a, b, c, d, and the letters for 'pig' and 'dog.'

Arithmetic.—Very simple, *e.g.*, 2 and 1? 3 and 2? 5 and 2? 7 and 1? &c., 7 − 1? 5 − 4? 6 − 3? 5 from 5? &c. How many legs has a chair? A dog has one leg cut off, how many left?

Standard I.

Reading.—Boys read from school set and girls from their own set. Questions on subject matter asked from girls, and questions on grammar of nouns asked from boys.

Writing.—Inspector was pleased to see the slates ruled with a slight margin, and on being told that they had been accustomed to doing a little dictation he dictated the following short sentence: 'Mother! I am going just now to see the town.'

Arithmetic.—The pupils being placed so as to prevent copying, the following sums were dictated in words:—

1. 700 + 51 + 251 + 809 + 777. 2,588. Ans.

2. 898 + 765 + 578 + 758 + 888. 3,887. Ans.

3. 700 − 209. 491. Ans.

STANDARD II.

Reading.—Boys read from the home set, and girls from the school set. Intelligence was tested by batches of eight or nine. Grammar of nouns, adjectives and verbs was professed, and the Inspector was very pleased to test them on these parts of speech.

Dictation.—'The handle is turned round; the boards strike the cream and move or churn it about; and small lumps of butter begin to come.'

Arithmetic.—The pupils being so arranged as to prevent copying the following sums were dictated, partly in words and partly in figures:—

1. 5,090 + 9,009 + 8,800 + 9,878 + 8,765 + 9,787 + 8,686. 60,015. Ans.

2. 90,091,547 − 8,985,768. 81,105,779. Ans.

3. 75,836,490 × 6. 455,018,940. Ans.

STANDARD III.

Reading.—(Royal Reader, No. III.)—Lessons were taken at random. Each pupil read a few lines and was asked for explanation of words and phrases.

Analysis.—Inspector asked pupils to make short sentences with subject and predicate, and then with subject, predicate, and object. He put together a predicate and an object, and asked if that was a sentence.

Dictation.—This was not difficult—five lines were given without any catching words in them.

Geography was taken with Standard IV. and confined chiefly to Perthshire; a few general questions on Lanarkshire, Renfrew and Ayr.

History.—A pupil teacher was asked to examine the class on the History of Mary, as a test of ability to teach.

Poetry.—Each recited a verse, but no meanings were required.

Arithmetic:—(1) Multiply nine hundred and eight thousand five hundred and seventy-six by six thousand and ninety-eight. 5,540,496,448. Ans.

(2) Divide 45,730,658 by nine thousand four hundred and seven. 4,861$\frac{3231}{9407}$. Ans.

(3) Divide one million by seventeen. 58,823$\frac{9}{17}$. Ans.

(4) Add together £204 12s. 6½d. + 19s. 10¼d. + £1 0s. 5¾d. + 2½d. + £1000 10s. £1207 3s. 1d. Ans.

STANDARD IV.

Reading.—Similar to Standard III. Lessons at random from Royal Reader, No. IV., with meanings of words and phrases.

Analysis was taken from the poem professed—full parsing, or nearly so, given of each successive word.

Geography.—This was the same as Standard III., which see.

History.—Reign of William III. and Mary II. William's personal appearance asked about—Qualities as a General—His apparent dulness everywhere but on the field of battle.

Poetry.—As in Standard III.

Arithmetic.—

1. How many steps of 3 ft. 3 in. each will a man take to walk 13 miles? 21,120 steps. Ans.

2. Take 3 qrs. 14 lbs. from 1 ton. 19 cwt. 0 qrs. 14 lbs. Ans.

3. Find how much it will take to pay 120 men for three week's work at the rate of 2s. 6d. each working day. £270. Ans.

4. How many sq. yards in 3 sq. miles? 9,292,800 sq. yds. Ans.

STANDARD V.

Reading.—(Chambers' Graduated, No. 5), similarly to Standards III. and IV.

Essay.—Story read from a sheet of note paper to V. and VI. A German Love Story.

Grammar.—Taken from poem professed, viz., 'Parting of Marmion and Douglas'—Scott's 'Marmion.'

History.—Questions on George I. and George II.

Geography.—Australia: Physical features and productions—chief towns in New South Wales and Victoria: Map-drawing professed—Iberian Peninsula—Scandinavia—Australia (these were not asked for).

Arithmetic:—(1) In a village there live seventeen cottagers; in another 25; in another 42; how much will each take in one square mile two roods? 7 a. 2 r. 20 p. Ans.

(2) Find by practice the value of 211½ yards at 17s. 8½d. per yard. £187 5s. 3¾d. Ans.

(3) Make out the following bill:—
4 curtains at £1 13s. 4d. per pair.
6 rugs at 10s. 2½d. each.
15 yds. stair-cloth at 2s. 7¼d. per yd.
36½ yds. stair-carpet at 5s. 9d. per yd.
£3 6s. 8d. + £3 1s. 3d. + £1 19s. 0¾d. + £10 9s. 10½d. = £18 16s. 10¼d. Ans.

(4) Add $\frac{3}{15}$ to $\frac{2}{30}$ of $\frac{6}{8}$, and divide the result by $\frac{4}{5}$ of $\frac{2}{3}$. $\frac{15}{32}$. Ans.

STANDARD VI.

Reading.—Extract from the 'Merchant of Venice' at the end of Star Reader, No. 6.

Grammar.—Taken from the same portion of Reading Book. Formation of words a special feature.

Geography.—Taken with Standard V., with a few questions on China and East Indian Archipelago added.

History.—A few questions on the reigns of George IV. and William IV., along with leading statesmen and authors.

Arithmetic.—(1) If I give ⅔ of my money to John, and the half of the remainder to James, how much have I left? ⅙. Ans.

(2) Bring 5 lbs. 4 oz. to the decimal of a hundredweight and £·3875 to the decimal of a guinea.

(*a*) ·046875. (*b*) $\cdot 369\dot{0}4761\dot{9}$. Ans.

(3) Find the interest on £390 12s. 6d. for 13 years at 3 per cent. £152 6s. 10½d. Ans.

Registers, Daily and General, tested for attendances and index numbers.

—o—

Quarterly Arithmetical Tests.

STANDARD I.—FIRST QUARTER.

1. 140
72
9
306
51

2. 681
341

3. 429
5

4. 12 × 2;
3 × 7;
6 × 4.

SECOND QUARTER.

1. 47
205
63
518
392

2. 130
70

3. 514
408

4. 5 × 10;
8 × 3;
4 × 11.

THIRD QUARTER.

1. 9
670
38
945
86

2. 638
159

3. 192
97

4. 8 × 4;
6 × 7;
9 × 5.

STANDARD II.—FIRST QUARTER.

1. 746 + 15,090 + 3,982 + 48,607 + 39 + 80,514.

2. Take 35,062 from 45,061.

3. 98 × 106.

4. 29d.; 45d.; 76d.

SECOND QUARTER.

1. Divide 28,530 by 5. Write the answer in words.

2. 7,698 × 591.

3. It took 370 bricks to pave a street the first day, 490 the second day, and twelve hundred bricks were used in three days. How many were used on the third day?

4. 87d.; 110d.; 128d.

THIRD QUARTER.

1. Multiply 58,079 by four thousand and eighty.

2. In a school there are 78 boys, 65 girls, and 90 infants. If half the infants were absent, and all the boys and girls were present, how many children would there be at school?

3. 87,648 ÷ 11.

4. 116d.; 134d.; 140d.

STANDARD III.—FIRST QUARTER.

1. Divide 258,020 by 38.

2. A gardener planted three thousand cabbages; one quarter of them died, and he sold 93 score. How many had he left?

3. How many times is 269 contained in half a million plus seventy-one?

4. How many buses, each able to hold 74 children, will be required to carry 1,607 boys and 1,205 girls to a school treat?

SECOND QUARTER.

1. Take four hundred and three pounds seven shillings and eight pence farthing from one thousand and two pounds five shillings and three pence three farthings.

2. How many must be subtracted from 49 score to leave 58 dozen?

3. £419 18s. 10¾d. + £596 13s. 7½d. + £280 16s. 11¼d. + £675 12s. 8¾d. + £328 15s. 6d. + £934 19s. 9½d.

4. A ship carried five hundred barrels of oil. In a storm 79 were thrown overboard, and the remainder were sold at £18 each. How much was received for them?

THIRD QUARTER.

1. What is the sum of seven thousand and sixteen pounds fifteen shillings and eight pence halfpenny, nine hundred and eight pounds seven shillings and eleven pence three farthings, fifty-nine pounds fourteen shillings and five pence half-penny, four pounds eighteen shillings and six pence farthing, nineteen shillings and ten pence halfpenny, seven pence farthing, and three farthings?

2. Divide the product of 513 and 516 by the quarter of 304.

3. Find the difference between £59,708 18s. 5¾d. and £60,450 16s. 2½d.

4. How much would be taken for 500 cups of tea at a penny a cup, and 300 cups of cocoa at two pence a cup?

STANDARD IV.—FIRST QUARTER.

1. £759 13s. 8¼d. × 94.

2. Find the cost of 378 yards at 9¾d. a yard.

3. Divide £74 10s. 7½d. by 75.

4. The rent of a house is £652 8s. 9d. per annum. How much must be saved daily to pay the rent?

SECOND QUARTER.

1. How many farthings must be added to 4,907 pence to make 30 guineas?

2. Find the difference in yards between 3 miles 7 fur. 34 po. and 5 miles 968 yards.

3. How many drams are there in 3½ cwt.?

4. Three pieces of cloth, each containing 38 yards, cost £73 7s. 9d.; what was the price per yard?

THIRD QUARTER.

1. Reduce nine hundred and twenty-one thousand six hundred square poles to square miles.

2. If a lady gave 15 guineas for silk at 8s. 9d. per yard, how much did she buy?

3. How many pints are there in 17 barrels, each containing 36 gallons?

4. A clock loses 3 min. 28 sec. daily; how many seconds will it lose during the month of January?

STANDARD V.—FIRST QUARTER.

1. Find the value of 8,347 tons of coal at 9s. 8½d. per ton.

2. A dealer bought 45 qrs. 6 bus. 2 pks. of wheat at 45s. per quarter, and sold it at £3 2s. 8d. per quarter. What was his gain?

3. How much would 7 cwt. 2 qrs. 22 lbs. cost at £5 16s. 8d. per ton?

4. What is the value of 15,780 articles at £15 13s. 5¾d. per score?

SECOND QUARTER.

1. If the keep of 7 horses for 3 weeks were 19 guineas, what would be the cost for the keep of 12 horses for the same time?

2. Make out a bill for:—

7½ lbs. beef at 9½d. per lb.;
5 lbs. lamb at 11½d. per lb.;
11¾ lbs. mutton at 10d. per lb.;
6½ lbs. veal at 10½d. per lb.;
9¼ lbs. suet at 7d. per lb.

3. What are the wages for 5 days 7 hrs. 25 min. at 7s. 6d. per day, a day's work being 10 hours?

4. Two men earn as much as 3 women, and 5 women earn as much as 8 boys. If a boy earn 3s. 4d. a day, what does a man earn?

THIRD QUARTER.

1. Add ⅝ of £1 and ⅝ of a shilling.

2. Bill:—

17 casks of butter at £3 12s. 6d. each;
13 score eggs at 5 for 6d.;
29½ lbs. of cheese at 7d. per lb.;
35¾ lbs. of ham at 6½d. per lb.;
11 ducks at 5s. 9d. per couple.

3. Simplify:—$(\frac{3}{4} + \frac{5}{8}) - (\frac{2}{3} + \frac{1}{6})$.

4. If 32 cwt. 2 qrs. 8 lbs. are carried 225 miles for three guineas, how far should 25 cwt. 1 qr. 22 lbs. be carried for the same money?

STANDARD VI.—FIRST QUARTER.

1. Simplify:—$(2\frac{5}{8} + 3\frac{5}{8} - 1\frac{5}{12}) \div 4\frac{4}{5}$.

2. What number bears the same ratio to 3·5 as 16 does to 14?

3. Add together $\frac{1}{385}$ and $\frac{1}{584}$, and give the answer in decimals to four places.

4. Divide $\dot{7}\cdot4\dot{5}$ by $\cdot0\dot{6}1\dot{5}$.

SECOND QUARTER.

1. Reduce £4 2s. 8¼d. to the decimal of 5¼ guineas.

2. Find the value of 18·975 acres.

3. A train goes 58⅔ feet in a second. How long will it take to go from London to Sheffield, a distance of 137 miles?

4. Add together £·59375, ·375 of a guinea, and ·0975 of £2 10s.

THIRD QUARTER.

1. What is the simple interest on £975 12s. 6d. at 2⅓ per cent. for 3 years?

2. What is the value of £$\frac{4\cdot98375}{\cdot075}$?

3. What sum will gain £157 10s. in a year at 4½ per cent.?

4. If ⅚ of an estate be worth £2,975, find the value of half an estate a quarter as large.

STANDARD VII.—FIRST QUARTER.

1. Find the amount of £395 for 19 years at 3½ per cent.

2. If 6 men earn 10 guineas in 8¾ days, working 9 hours per day, how much will 15 men earn in 7⅔ days, working 10½ hours per day?

3. Simplify:—$\frac{4}{7\frac{1}{2}} + \frac{\frac{1}{5} + \frac{1}{6} - \frac{1}{10}}{\frac{1}{5} \text{ of } \frac{1}{6} \text{ of } \frac{1}{10}} - \frac{1}{9}$.

4. The cost of keeping 18 horses is at the rate of £8 15s. per week. Find the cost of keeping 34 horses from June 1st to August 23rd, both days inclusive.

SECOND QUARTER.

1. In what time will £650 gain £116 3s. 9d. at 3¼ per cent.?

2. The population of a town was 47,635. Nineteen years later it had increased to 92,741. What was the average increase per annum?

3. Find the value of 6·1875 of 7 guineas.

4. In a school of 400 children, $\frac{3}{10}$ pay 3d., ⅜ pay 4d., and the remainder pay 6d. What is the average fee for each child?

THIRD QUARTER.

1. A jeweller bought a watch for £15 12s. 6d., and sold it for 20 guineas. What was his gain per cent. if £1 17s. 6d. be reckoned for expenses?

2. If a grocer lose 20 per cent. by selling sugar at 2½d. per lb., what will he gain per cent. by selling it at 3½d. per lb.?

3. What principal will amount to £694 9s. in 292 days at 4 per cent.?

4. In a war 17 per cent. of the soldiers were wounded, and 12 per cent. were killed. If 67,308 remained out of an army, what was the original number?

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	578.	1,225.	1,748.
2.	340.	60.	479.
3.	424.	106.	95.
4.	24; 21; 24.	50; 24; 44.	32; 42; 45.

STANDARD II.

	FIRST.	SECOND.
1.	148,978.	5,706.
2.	9,999.	4,549,518.
3.	10,388.	340 bricks.
4.	2s. 5d.; 3s. 9d.; 6s. 4d.	7s. 3d.; 9s. 2d.; 10s. 8d.

THIRD.

1.	236,962,320.	3.	7,968.
2.	188 children.	4.	9s. 8d.; 11s. 2d.; 11s. 8d.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	6,790.	£598 17s. 7½d.	£7,990 17s. 2½d.
2.	390 cabbages.	284.	3,483.
3.	1,859 times.	£3,236 17s. 5¾d.	£741 17s. 8¾d.
4.	38 buses.	£7,578.	£4 11s. 8d.

STANDARD IV.

	FIRST.	SECOND.
1.	£71,410 6s. 7½d.	10,612 farthings.
2.	£15 7s. 1½d.	2,761 yards.
3.	19s. 10½d.	100,352 drams.
4.	£1 15s. 9d.	12s. 10½d.

THIRD.

1.	9 sq. miles.	3.	4,896 pints.
2.	36 yards.	4.	6,448 seconds.

STANDARD V.—FIRST.

1.	£4,051 15s. 5½d.	3.	£2 4s. 10¾d.
2.	£40 9s. 4¼d.	4.	£12,366 15s. 0¾d.

SECOND.

1. £34 4s.
2. 5s. 11¼d. + 4s. 9½d. + 9s. 9½d. + 5s. 8¼d. + 5s. 4¾d. = £1 11s. 7¼d.
3. £2 3s. 0¾d.
4. 8s.

THIRD.

1. 17s. 6d.
2. £61 12s. 6d. + £1 6s. + 17s. 2½d. + 19s. 2¾d. + £1 11s. 7½d. = £66 6s. 6¾d.
3. $\frac{11}{12}$.
4. 288 miles.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	$1\frac{29}{578}$.	·75.	£68 5s. 10½d.
2.	4.	18 ac. 3 ro. 36 po.	£66 9s.
3.	·0044...	3 hrs. 25½ min.	£3,500.
4.	12·12.	£1 4s. 7½d.	£446 5s.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	£657 13s. 6d.	5½ years.	20 per cent.
2.	£26 16s. 8d.	2,374.	12 per cent.
3.	$80\frac{1}{8}$.	£45 9s. 6¾d.	£672 18s. 4d.
4.	£198 6s. 8d.	$4\frac{7}{20}$d.	94,800 soldiers.

Tests in Mental Arithmetic.

STANDARD I.

1. Take 47 from 50.	3.
2. How many are 3 times 9 + 13?	40.
3. Divide 40 marbles among 5 boys; how many is that for each boy?	8.
4. After paying 5d. for sugar, 3d. for soap, and 2d. for rice, what change would be left out of a shilling?	2d.
5. How many panes of glass are there in five windows, if there are 9 panes in four windows, and 12 in the other?	48.
6. What silver coin could you get for 48 farthings?	Shilling.
7. How many times can 7 be taken from 42?	6.
8. I had a florin, and bought 10 penny stamps and 12 halfpenny ones; how much had I left?	8d.
9. How many score are there in 60?	3.
10. What are 10 times 5?	50.
11. How much are 50d.?	4s. 2d.
12. How much more is required to make a crown?	10d.

STANDARD II.

1. Add 26 and 17.	43.
2. Take 43 from 100.	57.
3. How many pence more than two florins are 57d.?	9d.
4. How many are twice 19?	38.
5. What is the half of 19?	9½.
6. Find the cost of 6 lbs. of sugar at 2½d. per lb.	1s. 3d.
7. What change would be received out of a crown?	3s. 9d.
8. Take 8½d. from 11¼d.	2¾d.
9. How much are 4 times 2¾d.?	11d.
10. What is the difference between 11 farthings and 3½d.?	¾d.
11. If I posted a letter daily during December, how much would the postage amount to?	2s. 7d.
12. What would a dozen glasses cost at 4½d. each?	4s. 6d.

STANDARD III.

1. What would 70 oranges cost at 2 a penny?	2s. 11d.
2. Find the cost of 3 lbs. of beef at 8½d. per lb.	2s. 1½d.
3. What change would be received out of half-a-crown?	4½d.
4. Reduce 5 half-crowns to pence.	150d.
5. What would ¼ lb. tea cost at half-a-crown per lb.?	7½d.
6. How many sixpences are equal to £4 15s.?	190.
7. How many more are required to make 11 score?	30.
8. What would a pint of ale cost at a florin a gallon?	3d.
9. What is the cost of 108 tops at 1½d. each?	13s. 6d.
10. How much more would make a sovereign?	6s. 6d.
11. If 7 lbs. of mutton cost 6s. 5d., what is that per lb.?	11d.
12. If a clock lose 3 minutes daily, in how many days will it lose an hour?	20 days.

STANDARD IV.

1. How many fourpences are there in a guinea?	63.
2. What is the quarter of a thousand?	250.
3. Find the value of 250 halfpenny papers.	10s. 5d.
4. How many minutes are there in 1¾ hours?	105.
5. How many florins could you get for £5?	50.
6. What is the cost of half a lb. of tea at 2½d. per oz.?	1s. 8d.

7. How many pounds of tea at that price could you get for £3? 36.

8. What are a boy's wages for a fortnight at 2s. 3d. a day? £1 7s.

9. How many half-pints are there in 3½ gallons? 56.

10. A blackboard is 5 ft. long and 4 ft. broad; what is the area? 2 sq. yds. 2 ft.

11. A shopkeeper bought 60 eggs at 3 for 2d., and sold them at a penny each; how much did he gain? 1s. 8d.

12. How many lbs. of soap could be bought for half-a-crown, if 6 lbs. cost 1s. 6d.? 10.

STANDARD V.

1. If ¼ yard cost 7d., what would 2½ yards cost? 5s. 10d.

2. How many dozen are there in 15 score? 25.

3. If a ton cost £3 10s., what would 3½ cwt. cost? 12s. 3d.

4. If it were £4 per ton, how much could you get for that amount? $3\frac{1}{16}$ cwt.

5. If a man owe £1,000, and pay 5s. 6d. in the pound, what is the value of his assets? £275.

6. A bankrupt owes £800, and is worth £600; how much can he pay in the £? 15s.

7. What part of a sovereign is the half of 15s.? ⅜.

8. What is the difference between ⅜ and ¼? ⅛.

9. How many inches are there in ¾ of a yard? 27.

10. If 5 pair of boots cost £1 15s., what will 1½ dozen pair cost? £6 6s.

11. What is the interest on £625 for a month at 4 per cent.? £2 1s. 8d.

12. If an article cost £2 1s. 8d., and be sold at a gain of 10 per cent., what is the selling price? £2 5s. 10d.

STANDARDS VI. AND VII.

1. How many lbs. of sugar could be bought for 1s. 8d., if 6 lbs. cost 1s. 3d.? 8.

2. What decimal of a shilling is 8d.? ·$\dot{6}$.

3. What is the interest on £150 for 2½ years at 3 per cent.? £11 5s.

4. What sum will gain £10 in a year at 4 per cent.? £250.

5. How much is ·325 of half a-sovereign? 3s. 3d.

6. Which is the greater ·325 or ⅖? ⅖.

7. Express the difference as a decimal. ·075.

8. How many times can ¾ be taken from 7½? 10.

9. If 4 men earn £3 10s. in 3 days, how much would 12 men earn in 9 days? £31 10s.

10. What percentage of a score is a dozen? 60 per cent.

11. Divide a shilling between a boy and girl, giving the girl 3d. more than the boy. 4½d. and 7½d.

12. What is the selling price of an article which cost half-a-sovereign, and is sold at a gain of 250 per cent.? £1 15s.

Model Answers to Pupil Teachers' Examination Papers.

October 20th, 1888.

END OF SECOND YEAR.

Euclid.

(Three hours and a half allowed.)

BOYS ONLY.

[All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operation*, such as −, +, ×.]

(Answer two questions, including Question 3, if you can do so.)

1. The angles at the base of an isosceles triangle are equal to one another.

First part of Prop. 5, Euclid, Book I.

2. If two triangles have two sides of the one equal to two sides of the other, each to each, but the angle contained by the two sides of one of them greater than the angle contained by the two sides equal to them of the other, the base of that which has the greater angle is greater than the base of the other.

What is the object of the restriction, 'of the two sides PQ. PR let PQ be not greater than PR," PQR being one of the triangles?

Euclid, Book I., Prop. 24.

To prevent the possibility of there being three cases which would require proof, for the point S might fall upon or below the base QR as well as above it.

3. The equal sides AB, AC, of an isosceles triangle, ABC, are produced to F and G, so that AF = AG. If BG, CF intersect at H, show that AH bisects the angle at A.

In Prop. 5, Euclid, Book I., it is shown that $\angle$ GBC = $\angle$ FCB. ∴ I. 6, BH = HC. ∴ Ax 3, FH = GH.

Because in two $\triangle$s AF = AG, and FH = GH and base AH is common. ∴ $\triangle$ AFH = $\triangle$ ACH (I. 8) and $\angle$ AFC = $\angle$ ACH.

∴ I. 4, the remaining $\angle$s are equal, that is $\angle$ BAH = $\angle$ CAH.

∴ $\angle$ BAC is bisected by line AH.

Q.E.D.

Arithmetic.

GIRLS ONLY.

(Do three questions only, including the last, if you can.)

1. Simplify the fractions $\dfrac{(9\frac{3}{7} + 6\frac{11}{14} - 5\frac{12}{21}) \times 4\frac{2}{3}}{24\frac{5}{6}}$.

2. How many times will $\frac{3}{13}$ of the difference between $\frac{5}{8}$ of 1s. 10½d. and $\frac{4}{11}$ of 2s. 6¼d. be contained in two shillings?

3. Five fields containing respectively 5a. 3r., 7a. 2r., 1a. 1r., 5a. 3r., 6a. 2r., are rented for £5 5s., £8, £1 5s., £6 18s., and £6 10s. respectively; which of the fields is rented at the highest rate, which at the lowest?

4. Reduce to decimals ⅓, $\frac{7}{48}$, 5¼, and explain why $\frac{3}{11}$ cannot be reduced to a terminating decimal?

$$(1)\ \frac{(9\frac{3}{7} + 6\frac{11}{14} - 5\frac{12}{21}) \times 4\frac{2}{3}}{24\frac{5}{6}}$$

$$= 10\,\frac{18 + 33 - 24}{42} \times \frac{14}{3} \times \frac{6}{149}$$

$$= 10\tfrac{9}{14} \times \frac{14}{3} \times \frac{6}{149}$$

$$= \frac{149}{14} \times \frac{14}{3} \times \frac{6}{149}$$

$$= \underline{2.}\ \text{Ans.}$$

(2) $$\frac{2s.}{\frac{3}{13}(\frac{5}{9}\text{ of 1s. }10\tfrac{1}{2}\text{d.} - \frac{4}{11}\text{ of 2s. }6\tfrac{1}{4}\text{d.})}$$
$$= \frac{96}{\frac{3}{13}(\frac{5}{9} \times \frac{90}{1} - \frac{4}{11} \times \frac{121}{1})}$$
$$= \frac{96}{\frac{3}{13}(50 - 44)}$$
$$= \frac{96}{\frac{3}{13} \times \frac{6}{1}}$$
$$= \frac{96}{1} \times \frac{13}{3} \times \frac{1}{6}$$
$$= \frac{208}{3}$$
$$= \underline{69\tfrac{1}{3}}.\ \text{Ans.}$$

(3) $$\frac{105s.}{23},\ \frac{160s.}{30},\ \frac{25s.}{5},\ \frac{138s.}{23},\ \frac{130s.}{26}.$$
$$= 4\tfrac{13}{23},\ 5\tfrac{1}{3},\ 5,\ 6,\ 5.$$

The first is lowest rented, the fourth is highest rented.

(4) $\frac{1}{3} = \cdot\dot{3}.$

$\frac{7}{48} = \frac{\cdot 875}{6} = \cdot 1458\dot{3}.$

$5\frac{1}{7} = 5\cdot\dot{1}4285\dot{7}.$

The only factors of 10 are 5 and 2. As 11 does not contain either of these factors, and as only 10's are to be divided there will always be a remainder, and the fraction will not terminate.

Grammar.

BOYS AND GIRLS.

(*Answer questions 1 and 2, and one other question.*)

1. Express, in your own words, the meaning of the last six lines of this passage:—

Still is the *toiling* hand of Care,
The panting herds *repose:*
Yet hark, how through the peopled air
The busy murmur *glows!*
The insect youth *are* on the wing,
Eager to taste the honeyed spring,
And *float* amid the liquid noon;
Some lightly o'er the current *skim,*
Some show their gaily-gilded trim
Quick-glancing to the sun.

2. Parse the words printed in italic.

3. Give three examples of an adjective sentence, and three of an adverbial sentence.

4. Explain the use and meaning of the suffix in each of the following words:—

Addition. Pacify. Intensity. Magnitude. Demonstrable.

(1) While toilers in the field and the cattle are resting in the heat of the day, the newly-born insects are too anxious to taste the sweets of life to remain still, and are all flying hither and thither. Some are skimming gently the surface of the pools and the streams, while others are showing the gaudy colours of their wings and bodies by gaily dancing in the bright sunshine.

(2) *Still*—adj. of quality, qualifying *hand.*
is—verb, irreg., intrans., act., ind., pres., 3rd sing., agreeing with its nom. *hand.*
toiling—partl. adj. of qual., qualg. *hand.*
repose—verb, reg., intrans., act., ind., 3rd plur., agreeing with its nom. *herds.*
glows—verb, reg., intrans., act., ind., pres., 3rd sing., agreeing with its nom. *murmur.*
are—verb, irreg., intrans., act., ind., pres., plur., 3rd, agreeing with its nom. *youth.*
float—verb, reg., intrans., act., ind., pres. 3rd plural, agreeing with its nom. *youth.*
some—indef. pers. pro., com., plural, 3rd., nom. to *skim.*
skim—verb, reg., intrans., act., ind., pres., 3rd, plural, agreeing with its nom. *some.*

(3) *Adjective:*
(1) The horse *which my father bought* cost fifty pounds.
(2) The place *where he resides* is on a hill.
(3) The man *who committed the crime* is apprehended.

Adverbial:
(1) I was standing *where I now stand.*
(2) I study *when I can.*
(3) I requested him to call *when he was at liberty.*

(4) Addition: *-tion* denotes an action; forms noun.
Pacify: *-fy* is a root, and means *to do* or *to make;* forms verb.
Intensity: *-ty* denotes abstract idea, and forms noun.
Magnitude: *-tude* denotes abstract idea, and forms noun.
Demonstrable: *-ble* denotes the possibility of something being done, and forms adjective.

Geography.

BOYS AND GIRLS.

(*Answer three questions only, including the last, if you can.*)

1. Describe the position of Belgrade, Cadiz, Copenhagen, Ancona, Rouen, Dresden, and Warsaw. Name some of the historical associations connected with three of them.

2. Describe *two* of the great mountain ranges in India, and name the rivers which rise in them or break through them.

3. How is longitude measured? Explain how a day is apparently lost or gained in a voyage round the world.

4. Enumerate the chief productions of Ceylon, Jamaica, the Straits Settlements, and the British Possessions on the West Coast of Africa.

5. Draw a map of the Northern Coast of the Mediterranean Sea, or of the Eastern Coast of British India.

(1) *Belgrade,* situated at the junction of the Danube and the Save: it is the Capital of Servia.

Cadiz, near the S.W. extremity of Spain, a few miles north of Cape Trafalgar. In 1805 combined French and Spanish fleets were defeated by Nelson. 19 vessels destroyed, but Nelson killed.

Copenhagen, on the Sound, island of Zealand, capital of Denmark. Danish fleet defeated by Nelson in 1801. 18 vessels taken or destroyed.

Ancona, in central Italy, on the Adriatic, occupying one of the prominent points on the East coast.

Rouen, 44 miles up the Seine from Havre. Burning of Joan of Arc, 1431. Prince Arthur murdered here, 1203.

Dresden, capital of Saxony on the Elbe, 100 miles S.E. of Berlin.

Warsaw, ancient capital of Poland, on the Vistula, same latitude as Birmingham, 21° E. longitude. Sieges in 1794 and 1831.

(2) The *Himalayas* stretch along the whole of the northern frontier of India for a distance of 1,500 miles, and extend from 100 to 300 miles in breadth. The loftiest peak is Mount Everest, about 29,000 feet in height, and is the highest peak in the world. Other heights are Chimilari, Kunchinjinga, and Dhawalagira, slightly inferior in elevation. The mountains rise in a series of ridges of varying and increasing height till they reach the central ridge, covered with perpetual snow. There are several difficult passes from India into Thibet. The chief rivers rising in the Himalayas are the Indus and the Brahmapootra on the north side, and the Ganges and its tributaries on the south side of the range. The former flows N.W., and then finds its way through the ridge near the borders of Afghanistan, while the Bramahpootra flows eastward, and breaks through the lowest part of the range into the province of Assam. The Chenab, Ravee, Beaz, and Sutlej, are the chief tributaries of the Indus, and the Jumna of the Ganges.

The *Western Ghauts* form an almost unbroken chain for ten degrees along the west coast of India, and are the sources of the Krishna and the Godaveny, which flow eastwards through the E. Ghauts into the bay of Bengal, while the Tapty flows past the north end of the range into the Arabian Sea. They rise to a height of 4,000 feet. The Neilgherry hills in the south join the E. and W. Ghauts north of the Gap of Coimbatore.

(3) *Longitude* is reckoned by degrees, which are $69\frac{1}{15}$ m. in length at the Equator, but decrease as the meridians near each other towards the poles. The first meridian for England passes through Greenwich. Places E. or W. of Greenwich are in E. or W. longitude. A place can be as much as 180° E. or W. of Greenwich. The time of places in E. long. is *before* the time of Greenwich; the time of places in W. long. is *after* the time of Greenwich. If it be 12 o'clock at noon in the latter place, it is 12 o'clock at night of the same day in 180° E. long., but 12 o'clock at night of the preceding day in 180° W. long. But these places are identical. If, therefore, we have sailed eastwards, and are proceeding westwards, as soon as we cross the meridian of 180° we pass from the day after the day at Greenwich to the day before the day at Greenwich, that is, we gain a day.

In sailing from W. to E. the process is reversed. Thus, supposing it to be the 14th in going from W. long. to E. long., the next day we should call the 16th, and we should lose a day, while going the opposite direction we should have two days of the same date, and should gain a day.

(4) *Ceylon* produces coffee, sugar, rice, cinnamon, pepper, cocoa-nuts, teak and other valuable woods. Precious stones are largely found, and off the west coast there is an extensive pearl fishery.

Jamaica grows coffee, sugar, spices, and fruits, exporting also rum and molasses.

The Straits Settlements produce the betel nut or areca palm tree, sago, pepper, nutmegs, spices, rice, teak and other timbers.

West Africa sends us gold dust, ivory, palm oil, teak, gum-arabic, coffee, sugar, cocoa-nut, rice, maize, ground nuts, ginger, pepper, and dye woods.

END OF SECOND YEAR.

(*Two hours and a half allowed.*)

Needlework.

(*One hour allowed for this Exercise.*)

GIRLS ONLY.

Herring-bone a square of flannel (6 inches square); darn, as for a thin place (12 rows).

Arithmetic.

BOYS ONLY.

(*Answer three questions only, including the last if you can.*)

1. Of 100 men, 37 earn 3s. 10d. per day, 40 earn 3s. 6d. per day; what should be the daily pay of the remainder that the average weekly pay of the whole, at five days and-a-half to the week, should be £1 2s.?

2. At what rate per cent. per annum is simple interest calculated if £395 amount to £446 16s. 10½d. at the end of 3½ years?

3. If a weight of 40,000 ounces of silver can be made into 8,000 ornaments, each worth 25 shillings, how many ornaments of gold, each worth 10s., can be made out of 8,000 ounces of gold, the ratio of the value of gold to silver being 20 : 1?

4. A sum of £3,980 Stock is converted from a 3 per cent. Stock, at 101¼, into a 2¾ per cent. Stock, at 99½; find the yearly loss of income. (Neglect brokerage.)

What do you understand by a Stock being at par?

(1) Total pay 100 × 22s. = £110 0 0
Total pay for 37 = 37 × 5½ × 3s. 10d. = 39 0 1
" " 40 = 40 × 5½ × 3s. 6d. = 38 10 0
" " 23 for a week £32 9 11
" " 1 for a day = £32 9s. 11d. ÷ (5½ × 23)
= £0 5s. 1[illegible]d. Ans.

(2) £446 16s. 10½d. − £395 = £51 16s. 10½d. int.
∴ £395 : £100 :: £51 16s. 10½d. : 3¾. Ans.
yrs. 3½ : 1

(3) oz. 40,000 : 8,000 :: 8,000 : 80,000. Ans.
or. or.
sh. 10 : 25
val. 1 : 20

(4) First income £3,980 ÷ 100 × 3 = £119⅖.

Proceeds of sale $\frac{3980 \times 101\frac{1}{4}}{100} = £4029\frac{3}{4}$.

Second income $\frac{£4029\frac{3}{4} \times 2\frac{3}{4}}{99\frac{1}{2}} = £111$ 7s. 6d.

Diff. of income = £119 8s. − £111 7s. 6d.
= £8 0s. 6d. Ans.

Stock is at par when the actual value and nominal value are the same; *i.e.*, you can buy £100 Stock for £100 cash.

History.

BOYS AND GIRLS.

(*Answer three of these questions.*)

1. What were the chief provisions of Magna Charta, and by whose influence, and in what circumstances, was the Charter obtained?

2. Give some particulars respecting the First and Second Crusades, and the share England and her kings took in them.

3. Name, with dates, the chief events of the reign of Henry VI.

4. What do you know about these persons:—Drake, Spenser, Cranmer, Somerset (the Protector), and Raleigh?

(1) The chief provisions of Magna Charta were:—

(*a*) No scutage or aid could be imposed but by the common council of the kingdom.

(*b*) Common pleas were not to follow the court, but to be held in some certain place.

(*c*) No freeman could be apprehended, disseised of his freehold, imprisoned, outlawed, exiled, or sentenced, except by the lawful judgment of his peers or of the law of the land.

(*d*) Justice or right could neither be sold, delayed, nor denied to any man.

(*e*) All freemen might quit or return to the country at pleasure.

(*f*) No freeman could be fined excessively.

(*g*) No peasant or villein could be deprived of his tools or implements of husbandry.

A number of Anjevins and Poitevins, who had been allied with John during the invasion by Louis, sought an asylum in England. They secured John's favour, who gave them all the chief offices and fiefs at his disposal, thus doing dishonour to the Norman nobles. These foreigners by their exactions excited the anger of the Saxon citizens, and a national feeling sprung up between Normans and Saxons against the common tyrant, John. The barons rose in rebellion, seized London, and compelled John to sign the Charter at Runnymede, near Windsor, June 15, 1215.

(2) The first Crusade was attempted in 1096. It was undertaken for the purpose of delivering Palestine from the hands of the Saracens, who ill-treated European pilgrims to the Holy Sepulchre and other objects of religious interest in the Holy Land. William II. became mortgagee of Normandy to enable Robert the Duke to take part in it. The Crusaders captured Jerusalem, and were otherwise successful, but the city was afterwards recovered by the Saracens. The second Crusade in which England took part was in reality the third in order. Richard I. Cœur de Lion was the English king who joined this Crusade. In conjunction with Philip of France he took Acre, and the forces under Richard defeated the Saracens at Arsouf, in 1191. But the army was greatly wasted by sickness and did not attempt the recapture of Jerusalem. A truce was effected for three years, during which time the Crusaders held the sea-ports of Palestine, and pilgrims were not to be molested. On his way home, Richard was imprisoned, after being wrecked, by his enemy the Duke of Austria. The people of England who had suffered great exactions to find money for the Crusade, were now heavily taxed to find the money for his ransom. Richard had not been at home many months before he died, 1199.

(3)		A.D.
	Bedford made Protector	1422
	Dauphin crowned King of France	1422
	Battle of Verneuil	1424
	Siege of Orleans raised	1429
	Capture of Joan of Arc at Compiegne ...	1430
	Burning of Joan of Arc	1431
	Normandy and Guienne over-run	1449
	Rouen and Cherbourg surrendered	1450
	Impeachment of Suffolk	1450
	Jack Cade's rebellion	1450
	Wars of the Roses	1455—1485
	First battle of St. Albans	1455
	Bloreheath	1459
	Northampton	1460
	Wakefield	1460
	Mortimer's Cross	1461
	Second battle of St. Albans	1461
	Deposition of Henry	1461

(4) *Sir Francis Drake.*—Born 1545, died 1596. Employed in expeditions against the French and Spaniards; circumnavigated the globe; knighted on his return; one of the chief agents in the destruction of the Spanish Armada, 1588.

Edmund Spenser, 1553—1598.—One of the most celebrated of English poets. Wrote 'The Shepherd's Calendar,' and the 'Faerie Queen,' an allegorical poem in stanzas of nine lines.

Thomas Cranmer, 1489—1556, was Archbishop of Canterbury under Henry VIII. Pronounced the decree of divorce between Henry and Katharine of Arragon. Assisted in framing the present English Liturgy under Edward VI. Was burned for heresy under Mary.

Somerset was brother of Lady Jane Seymour, and Protector of England during early part of reign of Edward VI. Resigned his Protectorship; charged with raising a rebellion in the north, and of plotting to murder Northumberland, who had succeeded him; beheaded on Tower Hill, 1552.

Sir Walter Raleigh, 1552—1618.—Visited America, from whence he is said to have brought the potato and tobacco. Gained favour of Queen Elizabeth; distinguished himself at the defeat of the Armada. Took part in the Main Plot of 1603, on which plea he was executed in 1618, after a disastrous expedition to Central America. Spent above 12 years in prison, during which time he wrote a history of the world.

Teaching.

BOYS AND GIRLS.

(*Answer two questions only.*)

1. Arrange in groups the capital letters, putting together those which are similarly formed. Show in what order you would teach them, beginning with the easiest group, and proceeding to the most difficult.

2. Say exactly what are the requirements of the Code respecting Arithmetic in Standards I., II., III., and IV.; *or* (in an Infant School without a First Standard) what lessons in number can be given to the first class.

3. Explain what is the best use to make of a box of moveable letters in an Infant Class; *or* (in a school for older scholars) give some exercises in Mental Arithmetic suitable for Standard II.

(1) *Group* 1.—C, E, L, S, G.
Group 2.—Q, V, Y, Z, X, O, U.
Group 3.—I, T, J, F, A, N, M.
Group 4.—P, B, R, D, H, K, W.

The groups are arranged according to similarity of construction, as far as is practicable. The easiest capital to form is C. The others in Group 1 follow the same method of forming the loop. This is the case also with Group 2, with the exception of the letter O, which does not easily fall into any group. In Group 3 the down stroke of the I should be taught first. All the other letters partake of the same characteristic formation. Group 4 has the hardest and most complicated forms.

(2) *Standard I.*—Addition and subtraction of numbers of not more than three figures. Numeration and notation up to 1,000. In addition not more than five lines to be given. Multiplication table to 6 times 12.

Standard II.—Notation and numeration up to 100,000. The four simple rules to short division. Multiplication table and the pence table to 12s.

Standard III.—Former rules with long division, addition and subtraction of money.

Standard IV.—Compound rules (money), and reduction of common weights and measures.

Short exercises in mental arithmetic may be given in the examination of all Standards. These should not involve large numbers, should deal with concrete as abstract quantities, and should be preparatory to the work of the next higher Standard.

The lessons in number in the first class of an Infant School should consist of addition and subtraction of numbers mentally, writing numbers on slates up to 100, naming such numbers on the blackboard, working mentally questions with concrete quantities in mental arithmetic, with two and three times in the multiplication table.

(3) Children should be allowed to *pick out* the letters after learning them from the card, and themselves to form little words. This should be done with both capital and small letters. The teacher also should make use of it to show the building up of words; sentences should be formed by teacher, and spelt by the children; it should be used also for chief words in object lessons.

(*b*) (Exercises chiefly on sixes. Similar exercises should be formed on all the units.)

How many sixes make 60? What then will eleven sixes make? If I had 66 books, how many girls could get 6 each? A man has 6 rows of pennies and 11 in each row; how many pennies has he altogether? How many sixes are there in 72? If I had 72 pennies, how many boys could get 6 each?

Take 21 from 90. Add 73 and 17. From 90 take 17. What must be added to 55 to make 80? Add 9 and 12 and 21. How many times can 11 be taken from 96? How many farthings in 4½d.? in 11d.? in 10¼d.? Take 7½d. from 1s. How many balls at 1½d. can I get for 6d.? for 1s.? 4 lbs. of sugar at 2d.? 5 at 3d.? Change out of 2s.? How many sixpences in a crown? In a half-crown?

END OF THIRD YEAR.

(*Three hours and a half allowed.*)

Euclid.

BOYS ONLY.

[All generally understood abbreviations and symbols for *words* may be used, but not symbols of operation, such as −, +, ×.]

(*Answer two questions, including question 3 if you can do so.*)

1. If a side of any triangle be produced the exterior angle is equal to the two interior and opposite angles, and the three interior angles of every triangle are together equal to two right angles. State the corollaries.

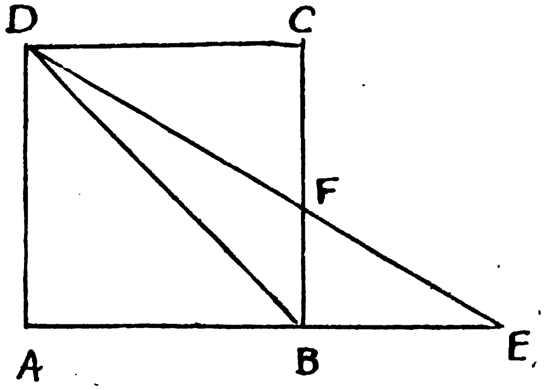
Euclid, Book I., Prop. 32.

2. Equal triangles on the same base and on the same side of it are between the same parallels.

Euclid, Book I., Prop.

3. ABCD is a square, AB is produced to any point E, and DE intersects BC at F. Show that the diagonal BD is greater than DF and less than DE.

(3)



(I. 32.) The three ∠'s of a △ are together = to two right ∠'s. But in △ DCF, ∠ DCF is a right ∠.

∴ two other ∠'s of same triangle = one right ∠.

∴ ∠ DCF is the greatest ∠ of △ DCF.

∴ (I. 18) Side DF is greater than side DC.

For the same reason DB is greater than DC.

But the exterior ∠ DFB is greater than the interior and opposite ∠ DCF, and the greater ∠ is subtended by the greater side.

∴ DB is greater than DF. In like manner it may be shown that DE is greater than DB.

Wherefore, &c.

Algebra.

BOYS ONLY.

(*Answer three questions only, including question 4, if you can do so.*)

1. *Prove* that $a^m \times a^n = a^{m+n}$, the letters representing any positive whole numbers. Divide $9x^4 - x^2y^2 + 10xy^3 - 25y^4$ by $3x^2 - xy + 5y^2$.

2. Find the G.C.M. of—

$12a^3 - 28a^2b + 17ab^2 - 3b^3$ and $12a^3 - 32a^2b + 25ab^2 - 6b^3$; and resolve the result into factors.

3. Add together $\frac{x^2 - xy + y^2}{x - y}$, $\frac{x^2 + xy + y^2}{x + y}$, and multiply the result by $\frac{x - y}{x}$.

4. (*a*) Solve the equation—

$$\text{(1.)}\quad \frac{x+1}{3} - \frac{5-3x}{7} = 8\frac{2}{7} - \frac{x-7}{14}.$$

(*b*) A man bought a certain number of oranges at 3 for 2d., and twice that number at 10d. the dozen; by selling them all at a penny each, he gained 2s. How many did he buy?

(1) $a^m = a \times a \times a \times a$ .... to m factors.
$a^n = a \times a \times a$ .... to n factors.
$\therefore a^m \times a^n = a \times a \times a$ to m factors.
i.e., $a^m \times a^n = a^{m+n}$.

$$3x^2 - xy + 5y^2)\,9x^4 - x^2y^2 + 10xy^3 - 25y^4\,(3x^2 + xy - 5y^2$$
$$\underline{9x^4 - 3x^3y + 15x^2y^2}$$
$$3x^3y - 16x^2y^2 + 10xy^3$$
$$\underline{3x^3y - x^2y^2 + 5xy^3}$$
$$-15x^2y^2 + 5xy^3 - 25y^4$$
$$\underline{-15x^2y^2 + 5xy^3 - 25y^4}$$

(2) $$12a^3 - 28a^2b + 17ab^2 - 3b^3)\,12a^3 - 32a^2b + 25ab^2 - 6b^3\,(1$$
$$\underline{12a^3 - 28a^2b + 17ab^2 - 3b^3}$$
$$-b)\,\underline{-4a^2b + 8ab^2 - 3b^3}$$
$$4a^2 - 8ab + 3b^2$$
$$4a^2 - 8ab + 3b^2)\,12a^3 - 28a^2b + 17ab^2 - 3b^3\,(3a - b$$
$$\underline{12a^3 - 24a^2b + 9ab^2}$$
$$-4a^2b + 8ab^2 - 3b^3$$
$$-4a^2b + 8ab^2 - 3b^3$$

G.C.M. $= 4a^2 - 8ab + 3b^2$. Ans.
$= \underline{(2a - 3b)(2a - b)}$. Ans.

(3) $$\frac{x^2 - xy + y^2}{x - y} + \frac{x^2 + xy + y^2}{x + y}$$
$$= \frac{(x^3 + y^3) + (x^3 - y^3)}{x^2 - y^2}$$
$$= \underline{\frac{2x^3}{x^2 - y^2}}.\ \text{Ans.}$$
$$\frac{2x^3}{x^2 - y^2} \times \frac{x - y}{x}$$
$$= \frac{2x^3(x - y)}{(x^2 - y^2)\,x}$$
$$= \underline{\frac{2x^2}{x + y}}\ \text{Ans.}$$

4. (*a*) $$\frac{x + 1}{3} - \frac{5 - 3x}{7} = 8\frac{2}{7} - \frac{x - 7}{14}$$
$$\frac{7x + 7 - 15 + 9x}{21} = \frac{116 - x + 7}{14}$$
$$\frac{16x - 8}{21} = \frac{123 - x}{14}$$
$$32x - 16 = 369 - 3x$$
$$35x = 385$$
$$x = \underline{11}.\ \text{Ans.}$$

(*b*) x = Number bought at 3 for 2d.
$2x$ = „ „ 10d. per doz.
$$\frac{2x}{3} + \frac{2x \times 10}{12} = 3x - 24$$
$$8x + 20x = 36x - 288$$
$$-8x = -288$$
$$x = 36$$
$$2x = 72$$
Total bought = $\underline{108}$. Ans.

Mensuration.

BOYS ONLY.

(*Answer one question.*)

1. Find the area and the rent of a triangular field whose sides are 19, 60, and 73 poles, at 45s. the acre.

2. Find the side of a square whose area is equal to the area of a rhombus, whose diagonals are 52 feet and 416 feet.

(1) $$\frac{19 + 60 + 73}{2} = 76$$
$$\sqrt{76(76 - 19) \times (76 - 60) \times (76 - 73)}$$
$= \sqrt{207936}$ poles.
$= 456$ poles
$= 2·85$ acres. Ans.
$2·85 \times 2·25$
$= £6·4125$
$= £6$ 8s. 3d. Ans.

(2) Area of rhombus or square
$$= \frac{416 \times 52}{2} = 10816$$
$\therefore$ side of sq.
$= \sqrt{10816}$
$= 104$ feet. Ans.

Arithmetic.

GIRLS ONLY.

(*Answer three questions only, including the last, if you can.*)

1. A certain number is multiplied by 3·79; and this product when divided by ·0015 gives a quotient ·001137. Find the number.
2. Divide the difference of $7\frac{1}{5}$ and $3\frac{7}{15}$ by $1\frac{3}{5}$.
3. Find the value of $5\frac{1}{4}$ of 5s. 6d. + ·125 of 8s. 10d. − $1\frac{1}{7}$d. of 3s. $7\frac{3}{4}$d.
4. Find a fourth proportional to $3\frac{1}{2}$, ·5, 1·75; and explain why the following proportion 3s. 7d. : 42 miles :: 7s. 2d. : 84 miles is incorrect.

(1) Quotient × Divisor Dividend.
·001137 × ·0015 = ·0000017055
Product Multiplier Multiplicand.
·0000017055 ÷ 3·79 = $\underline{·00000045}$. Ans.

(2) $$(7\tfrac{1}{5} - 3\tfrac{7}{15}) \div 1\tfrac{3}{5}$$
$$= 3\,\frac{18 - 7}{15} \div 1\tfrac{3}{5}$$
$$= \frac{56}{15} \times \frac{5}{8}$$
$$= \frac{7}{3}$$
$$= \underline{2\tfrac{1}{3}}.\ \text{Ans.}$$

(3) $5\frac{1}{4}$ of 5s. 6d. + ·125 of 8s. 10d. − $1\frac{1}{7}$ of 3s. $7\frac{3}{4}$d.
$= \frac{21}{4} \times \frac{11}{2}$s. + $\frac{1}{8} \times$ 106d. − $\frac{8}{7}$ + 175f
$= \frac{231}{8}$s. + $13\frac{1}{4}$d. − 50d.
$=$ 28s. $10\frac{1}{2}$d. + $13\frac{1}{4}$d. − 4s. 2d.
$= £1$ 5s. $9\frac{3}{4}$d. Ans.

(4) $3\frac{1}{2} : ·5 :: 1·75 : x$
or $3\frac{1}{2} : \frac{1}{2} :: 1\frac{3}{4} : x$
$\therefore \frac{1}{2} \times \frac{7}{4} \times \frac{2}{7} = \frac{1}{4}$. Ans.

The first and second terms of a proportion should be alike. In the example given they are not. The proportion therefore is wrong.

END OF THIRD YEAR.

(*Two hours and a half allowed.*)

Needlework.

GIRLS ONLY.

(*One hour allowed for this exercise.*)

Make a pillow-case (½ in. scale), completing it as far as time will allow.

Arithmetic.

BOYS ONLY.

(*Answer three questions only, including the last if you can.*)

1. Find the square root of 9980·01.
2. What sum will amount to £819 16s. 3d. in $5\frac{1}{2}$ years at $4\frac{3}{4}$ per cent. per annum simple interest?
3. What will be the cost of paving a square court-yard whose side is 40 ft. with paving stones 2 ft. 8 in. long and 15 in. wide, each costing 7s. 9d.?
4. Form a simple rule that shall include all cases of division of decimals. Work by equivalent vulgar fractions the sum ·005 ÷ ·02 = ·25.

(1) $$9980·01\,(\underline{99·9}.\ \text{Ans.}$$
$$\underline{81}$$
$$189\,)\,1880$$
$$\underline{1701}$$
$$1989\,)\,17901$$
$$\underline{17901}$$

(2) £100 will make $4\frac{3}{4} \times 5\frac{1}{2} = £26\frac{1}{8}$, and will become $£126\frac{1}{8}$
$\therefore £126\frac{1}{8} : £819\frac{13}{16} :: £100 : x$
$\frac{8}{1009} \times \frac{13117}{16} \times \frac{100}{1}$
$= \underline{£650}$. Ans.

(3) $(40 \times 40) \div (2\frac{2}{3} \times 1\frac{1}{4}) \times 7\frac{3}{4}$s.
$= 1600 \div 10\frac{1}{3} \times 7\frac{3}{4}$
$= 3720$s.
$= £186$. Ans.

(4) Bring both fractions to whole numbers by multiplying by a number containing as many o's as there are decimal places in the fraction with the greatest number of decimal places and divide as in whole numbers, putting down a decimal point as soon as the divisor will not divide into the dividend.

Example—4·096 ÷ 15·1347. Multiply by 10000 and thus get 40960 ÷ 151347. The latter will not go. Put down a decimal point and bring down o's.

$$\begin{aligned} &·005 + ·02 = ·25. \\ &\tfrac{5}{1000} \div \tfrac{2}{100} \\ &= \tfrac{5}{1000} \times \tfrac{100}{2} \\ &= \tfrac{5}{20} \\ &= \tfrac{1}{4} \\ &= \underline{·25}. \text{ Ans.} \end{aligned}$$

Grammar.

BOYS AND GIRLS.

(Answer three questions only.)

1. Paraphrase this stanza—

And *forth* they *pass*, with pleasure forward *led*,
Joying to hear the *birds'* sweet harmony
Which therein shrouded from the tempest dread
Seemed in their song to scorn the cruel *sky*.
Much can they *praise* the trees *so straight* and high,
The sailing pine, the cedar proud and tall,
The vine-prop elm, the poplar never dry,
The builder oak, sole king of forests all,
The aspen, good for staves, the cypress funeral.

2. Analyse the first four lines, and parse the words printed in italic.

3. Explain the difference between a common, a proper, and an abstract noun; and give examples. Give six terminations, Latin and English, by which you can distinguish abstract nouns from others.

4. What is the signification of the syllables, *in, sub, ob, un, en, circum, post,* when used as prefixes? Give two examples of each.

5. Correct or justify these sentences:—
I wished to have seen him yesterday.
Almost every house in the place are pensions or hotels.
The phenomena was very curious.
Do not write, except you find it to be needful.
He prefers reading poetry than prose.

(2) (*a*) Principal Sentence.
Connective—And.
Subj.—they.
,, *Adjuncts.*—joying to hear the birds' sweet harmony, with pleasure forward led.
Pred.—pass.
Ext. of Pred.—(place) forth.
Adjective to *birds* in P.S.
Subj.—which.
,, *Adjuncts*—therein shrouded from the tempest dread.
Pred.—seemed.
Ind. Obj.—to scorn the cruel sky in their song.

(*b*) *Forth*—adv. of place, modifying *pass*.
pass—verb, reg. intrans., act., ind., pres., 3rd plur., agreeing with its nom. *They*.
led—past part. of *to lead*, referring to *they*.
birds'—com. noun, com. gen., plur., poss., gov. by *harmony*.
which—rel. pro., com., plur., 3rd., nom. to *seemed*.
therein—adv. of place, modifying *shrouded*.
seemed—verb, reg., intrans., act., ind., 3rd., plur., agreeing with its nom. *which*.
sky—noun, com., neut., sing., obj., gov. by *to scorn*.
praise—verb, reg., trans., inf., pres., gov. by *can*.
so—adv. of degree, modifying *straight*.
straight—adj. of quality, qualifying *trees*.

(3) A proper noun is the particular name given to a person, place, or thing, to distinguish it from others of the same kind. A common noun is the name given in common to all things of the same class or kind. Thus:—London and Manchester are cities. *Cities* is a common noun, because it is the name given to all places of the same kind as the two named, but *London* and *Manchester* are proper nouns, because they are the particular names by which we distinguish these cities from other cities. An abstract noun denotes a quality or attribute which we regard in our minds as having an independent existence, or the name of an action: thus, whiteness, goodness, writing, are abstract nouns.

Terminations of abstract nouns:—
Latin—age, ance, tion, ty, tude, ence.
English—hood, lock, ship, ness, -th, ledge.

(4) *in*—before an adjective means *not*, as inelegant, indecent.
in—before a verb means *in* or *into*, as induct, include.
sub—under, as subject, subtract.
ob—against, or *in the way of*, as object, obstruct.
un—not, as unhappy, uncover.
en—in, as endear, enhance.
circum—round, or *about*, as circumscribe, circumspect.
post—after, as postpone, postdate.

(5) I wished to see him yesterday.
Almost every house in the place is a pension or an hotel.
The phenomena were very curious.
Do not write unless you find it to be needful.
He prefers reading poetry to prose.

Geography.

BOYS AND GIRLS.

(Answer three questions only, including the last, if you can.)

1. Give a description of three of the following:—Siberia, Afghanistan, Mecca, the Red Sea, the Nile, the Sahara.

2. Name the chief mountain systems of Asia, and give a description of one of them.

3. If a ship is sailing from England to Australia round the Cape of Good Hope, how may her course be assisted by ocean currents and by winds?

4. Describe the courses of the Congo and the Indus. What recent attempts at colonization and exploration are connected with the former?

5. Draw a map containing Turkey in Asia, Persia, and Arabia; or a map of the Chinese Empire, showing the principal rivers.

(1) *Siberia.*—A vast territory, covering 4,700,000 sq. miles, in the north of Asia; watered by the rivers Obi, Irtish, and Yenisei, flowing into the Arctic Ocean, and the Amoor into the Pacific. Is a great plain, inclined slightly towards the Arctic, and consists largely in winter of frozen plains, and in summer, near the rivers, of immense swamps. The south has large forests of pine, larch, and birch. The country is rich in gold, silver, copper, platinum, tin, zinc, and other minerals.

Afghanistan lies south of Turkestan, west of India, north of Beloochistan, and east of Persia. Its surface is a succession of high valleys and table lands, varying in elevation from 3,000 to 5,000 feet, situated on the declivities of the Hudu Koosh and the Soliman Mountains. Towards the west it is more flat, and here is found the Desert of Seistan. Between India and Afghanistan are many passes, the best known being the Khyber and the Koord Kabul. Kabul, Herat, Kandahar, and Jellalabad, are the chief towns. Many of the people are wandering tribes ruled by chiefs called Khans.

Mecca, the capital of the province Hedjaz, in Arabia, situated in a narrow valley on the Red Sea, 51 miles from Jiddah. It was the birth-place of Mahomet in 569, and is venerated by Mussulmans as a Holy City. It contains a spacious temple, in the centre of which is the shrine of the Prophet. Many thousands of pilgrims visit it every year. The population of the town is 45,000.

(2) The chief mountain systems of Asia may be said to centre round or radiate from the Bolor Tagh mountains, running north and south between Chinese and Independent Turkestan. The great chain stands on the lofty plateau of Pamir, and attains an elevation of 19,000 feet.

The western system forms the northern boundary of the table lands of western Asia. The chief parts of the system are the Hindoo Koosh, the Paropamisna, Elburz and Kurdistan Mountains, the Taurus, Anti-Taurus, and Lebanon Mountains, and the Caucasus, which mark the limits of Asia.

The south-eastern system includes the Himalayas (Mount Everest, 29,000 feet), the Karakorum Mountains, the mountains of Aracan, Siam, Cambodia, and Anam. The Vindhya and East and West Ghauts branch southwards into the Indian Peninsula.

The eastern system includes the Kuen Lun Mountains and the Pi Ling Mountains.

The north-eastern system embraces the Thian Shan Mountains, the Altai, and the Yablonoi ranges.

(3) After crossing the Bay of Biscay she would be assisted by the return current which helps to form the Sargasso Sea. In a short time after she would get into the region of the trade winds, and keepnig close to the coast would have the advantage of the Guinea current. Along the west coast of Southern Africa she would be impeded by the Equatorial and the South-East Trades, but keeping well south of the Cape of Good Hope would get into the Equatorial counter-current of the Indian Ocean, an advantage she would continue to receive to the coast of Australia.

(4) The Indus rises in Thibet on the northern side of the Himalayas, and flows in a north-west direction through the valley of Cashmere till it reaches the eastern portion of the Hindoo Koosh. It then turns south-west and flows in that direction parallel with the Soliman Mountains till it reaches the Arabian Sea, into which it empties itself by seven mouths.

Near its bend, 250 miles from its source, it is joined by the Shyook, and after piercing the Himalayas by the Cabul, near Attok. It afterwards receives the united waters of the five rivers of the Punjab, Jhelun, Chenab, Ravee, Beaz, and Sutlej. Its whole course is about 950 miles.

The Congo is a great river of west Equatorial Africa. It begins in Lake Bangweolo and flows north-west, and then flows south-west into the Atlantic. It is known first as the Luapula, then as the Lualaba, and afterwards as the Zaire, or Congo. Its whole course is estimated at 2,900 miles, and it receives many tributaries, the greatest being the Ikelembo. Its course is broken by two main cataracts, or falls, the lower being known as the Yellala Falls.

Mr. H. M. Stanley travelled its whole course, and gives a good account of the fertility of the immense district drained by it, which has since been formed into the Congo Free State, with the King of Belgium at the head.

History.

BOYS AND GIRLS.

(*Answer three questions only.*)

1. Mention in chronological order, with dates, *ten* of the most memorable events in the reign of George III.

2. Say what you know about Walpole, the elder Pitt, and Sir Robert Peel.

3. Say where these places are and what happened at them:—Edge Hill, Worcester, Dunkirk, La Hogue, Culloden, and Corunna.

4. Mention the chief events in connection with the Seven Years' War.

5. Name some of the great improvements in manufactures in the reign of Queen Victoria.

(1) Treaty of Paris, 1763.
Prosecution of John Wilkes, 1763.
War of American Independence, 1775—1783.
Treaty of Versailles, 1782.
Wars with France, 1793—1803, and 1803—1815.
Capture of the Cape, 1795.
Lord Edward Fitzgerald's Rebellion (Vinegar Hill), 1798.
Union of Great Britain and Ireland, 1801.
Treaties of Paris, 1814 and 1815.
Treaty of Ghent, 1814.
Battle of Waterloo, 1815.

(2) Sir Robert Walpole lived from 1676 to 1745. He was Secretary for War in the reign of Queen Anne, but did not rise to great power in the country till the South Sea scheme came to a climax in 1721. He then formed a scheme for lessening the great calamities which the bursting of the bubble caused and became Chancellor of the Exchequer, and afterwards Prime Minister. For a time he succeeded in avoiding war with Spain, but was afterwards driven into it in 1742, after having maintained peace and his own power for nearly twenty years. The attacks on his administration drove him from power and he retired as Earl of Oxford.

William Pitt, Earl of Chatham, the 'great commoner,' entered the House of Commons in 1735 and became troublesome to Walpole. He hated bribery, by means of which Walpole had maintained his power. In 1756 he became Secretary of State and was the most prominent Statesman in England during the Seven Years' War. He objected strongly to the taxes on the American Colonies which led to the War of Independence, and died shortly after a great speech against it in 1778.

Sir Robert Peel, 1788—1850, commenced public life as an opponent of reform, but gradually changed his opinions and while in office succeeded in passing bills for Catholic emancipation, repeal of the Corn Laws, many reforms in taxation, the forming of a police force. He first imposed the Income Tax. Was premier in 1834—5 and 1841—6.

(3) *Edge Hill*, in Warwickshire, first battle in the Civil War, October 23rd, 1642.

Worcester, county town of Worcestershire, on the Severn. In 1651 Cromwell defeated Prince Charles who had been crowned in Scotland, and had then marched into England. Prince Charles escaped to France.

Dunkirk, a strong seaport of France, north-east of Calais. Taken by the Allies in 1658. Sold to France by Charles II. for £500,000.

La Hague, a cape at the north-west of the peninsula of Manche, in the English channel. Defeat of the French off the cape in 1692.

Culloden, a bleak moor east of Inverness. Duke of Cumberland defeated the Young Pretender here in 1746.

Corunna, a seaport of Galicia, in Spain. Sir John Moore killed here after defeating Marshal Soult in 1809.

(4) In 1756 Admiral Byng was shot for failing to relieve Minorca.

In 1757 Clive gained the battle of Plassey.

In 1759 Wolfe gained Quebec, and the battle of Minden was won in Germany, while Admiral Hawke destroyed the French fleet off Brest.

In 1763 Spain lost Havannah, and the French most of the West India islands.

The Treaty of Paris ended the war.

(5) Machines driven by steam or water power have almost entirely taken the place of those worked by hand, and the work is now done in large factories by rapid processes instead of the slow, laborious methods of former years. Cotton, woollen, silk, and linen fabrics are now all made in this way. Great improvements in the machinery have been made from time to time, so that fabrics of every colour and of every degree of fineness can be made by machinery. Carpets, shawls, lace, and hosiery, are instances of this improvement. The manufacture of boots and shoes by machinery, and the invention of the sewing machine, have assisted in providing cheaper articles of clothing.

The process of manufacturing steel has been invented and has led to great improvements in articles made of that metal, to a revolution in the building of ships, and to greatly increased facilities for travelling, while the improvements in the manufacture of type and books has led to a much greater use of the improved and cheapened article. Improvements in the manufacture of agricultural implements, as sowing, reaping, ploughing and thrashing machines, have led to cheapened food and more varied and increased production of vegetable products.

Teaching.

BOYS AND GIRLS.

(*Answer two questions only.*)

1. Make notes for a collective lesson on one of these subjects:—
    (*a*) A river (for Standard II.).
    (*b*) The colour blue (for Infants).
    (*c*) Adverbial sentences (first lesson).

2. Explain how you would make young children familiar with the right use of the figures 17 as the notation for seventeen.

3. Explain, as to a class, the meaning of the word 'Tense' in Grammar, and give an outline of a first lesson on the Tenses.

4. Draw a plan of some school-room with which you are familiar, and give its dimensions and those of the desks and chief articles of furniture. Say of what use such a plan is to young children.

(1) (*a*) *A River.*—(For Standard II.)

[The method of introducing a lesson of this kind will vary with the locality, according as it is hilly or flat, far or near from a river. In a flat district there is much more need for vivid description than in the former.]

Introduction.—Refer to a rainy day: clouds black, heavy, pouring rain on everything around. What becomes of it all? Then follow it from the roof, down the spouts, into the road or street, *always finding its way to a lower level*, till it reaches a hollow (lake) or a stream.

Next notice similarity between roof of house and mountains. What does the roof do to the water? So do mountains. Act as *Watershed* or *Waterparting*. (Write on B.B., and see that word is well understood.)

Beginning of a River.—Now follow water which falls on one side of the hill. Some sinks into the ground. All cannot. Drops join and form little threads of water. These unite and form a *streamlet*. This beginning of the river is called its *source*. (Write on B.)

Basin.—Next show how land is usually in ridges and hollows (hills and valleys); the high land often enclosing a great hollow like a *basin*. (Draw attention to natural features of locality if of this kind, or use sand model or other model.) Water from all the hills runs down the sides. Streams join and form the river. The whole land drained is the basin.

Parts of a river. Take next the names given to various parts of river. Streams make the river grow—called *Feeders* (use this name only at first and not Tributaries). The place where the water lies—*bed*. The land on either side—*banks*. Names of banks—*right* and *left*: Why? distinguish between them. Place where water is discharged—*mouth*. Show various kinds on map. Make sketch on blackboard; also use sand model. Question on whole. Bring children out to point on sketch map, or on sand map, and to make on board or sand model.

(2) First get them to know the meaning of *ten*. Put ten marbles in a bag and call it *one* ten. Put seven loose marbles by its side, and say one ten and seven. Then show that a ten is more than a seven and the biggest is put first. But it is easier to say seventeen (or seven and a ten) than to say one ten and seven. So we shorten the words by saying seventeen. Practise with the bag and other loose numbers, and have the value put upon the board till the form is perfectly familiar.

(3) *Tense* is the form of the verb used to denote time. The form of the verb undergoes a change whenever we wish to represent an action as taking place at different periods of time.

First Lesson on Tense.

Write three short sentences on B.B., as—

(*a*) John sings.

(*b*) John sang.

(*c*) John will sing.

By questions elicit the fact that these three sentences denote the same action occurring at three different times. (*a*) refers to time *present*, (*b*) to time *past*, (*c*) to time to come or *future* time.

Next draw attention to the form of the verb in these sentences, and ask for the difference. In (2) the vowel is changed. In (3) *will* is prefixed. So that each is different from the other.

∴ To denote a change of time we have a change of form. Then write *definition* (as at the beginning of this answer).

Now give other verbs of a similar kind, and let the past and future tenses of these be given.

Next give some regular verbs and show how the *past* is formed.

Have a written exercise performed.

(4) [In answering this question each pupil teacher would probably take his own school. The latter part of the question might be answered as follows]:—
The uses of plans to young children are various. By their means they may be taught some idea of proportion and scale. Their powers of observation are brought into play, and they learn to take particular notice of the forms, sizes, and places of different objects. Their first ideas of maps may be gained from plans, and when taught to draw them, the power of imitation is also brought into operation.

END OF FOURTH YEAR.

(Three hours and a half allowed.)

Euclid.

BOYS ONLY.

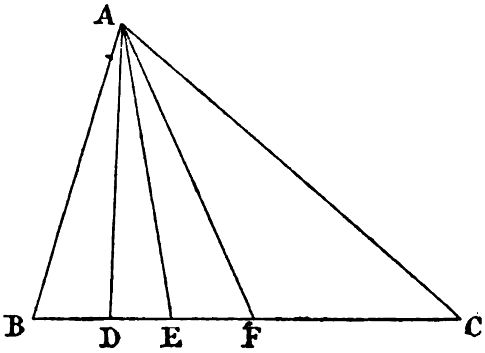
[All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operation*, such as −, +, ×.]

(Answer two questions, including No. 3, if you can do so.)

1. If a straight line be divided into two equal parts, and also into two unequal parts, the rectangle contained by the unequal parts, together with the square on the line between the points of section, is equal to the square on half the line.
Euclid: Book II., Proposition 5.

2. To divide a given straight line into two parts, so that the rectangle contained by the whole and one of the parts may be equal to the square on the other part.
Euclid: Book II., Proposition 11.

3. AD is perpendicular to BC the base of the acute-angled triangle ABC. AE bisects the angle A. Show that the difference of the angles at B and C is equal to twice the angle DAE.



(3)
At A in EA make ∠ EAF = ∠ EAD.
By I. 32 ∠ ADC, *i.e.*, ∠ ADB = ∠'s DBA, BAD.
It also equals ∠'s DAC, ACD, *i.e.*, ∠'s DAE, EAF, FAC, ACD. And ∠ DAF = twice ∠ DAE, because ∠ DAE = ∠ EAF.
∴ ∠ ADB = twice ∠ DAE, ∠ FAC, and ∠ ACD.
∴ ∠'s DBA, BAD = twice ∠ DAE and the ∠'s FAC, ACD.
But ∠ BAD = ∠ FAC.
For the whole ∠ BAE = whole ∠ EAC (Hyp.), of which the parts DAE, EAF (Constr.) are equal.
∴ remainder DAB = remainder FAC.
Take away the equal angles BAD and FAC.
Then ∠ DBA = twice ∠ DAE and ∠ ACD.
i.e., ∠ at B is greater than ∠ at C by twice ∠ DAE.
Q. E. D.

Algebra.

BOYS ONLY.

(Answer three questions, including questions 1 and 4, if you can do so.)

1. Prove that $(a^2 + bc)^2 + (b^2 + ac)^2 + (c^2 + ab)^2 - (ab + ac + bc)^2 = a^4 + b^4 + c^4$.
Also verify the equality when $a = 2$, $b = -3$, $c = -4$.

2. Find the L.C.M. of $2x^2 - 7xy + 6y^2$; $4x^2 - 8xy + 3y^2$; $2x^2 - 5xy + 2y^2$.

3. Prove that $\frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc}$, where the letters denote any numbers.

Simplify $\left(\frac{x}{(1 - x)^2} + \frac{1}{1 - x^2}\right) \div \frac{1 + x^2}{1 + x}$.

4. Solve the equations—

$$(a)\ \begin{cases} 7x - 8y + 22 = 0. \\ 11x - 10y - 4 = 0. \end{cases}$$

$$(b)\ 21x^2 - 36 = x.$$

(1)
$$\begin{aligned}(a^2+bc)^2 &= a^4+2a^2bc+b^2c^2\\ (b^2+ac)^2 &= b^4+2ab^2c+a^2c^2\\ (c^2+ab)^2 &= \underline{c^4+2abc^2+a^2b^2}\end{aligned}$$

Subtract

$$(ab+ac+bc)^2 = a^2b^2+a^2c^2+b^2c^2+2a^2bc + 2ab^2c+2abc^2$$

$$\text{Diff.} = \underline{a^4+b^4+c^4.}$$

$$\begin{aligned}[2^2+(-3.-4)]^2 &= (4+12)^2 = 256\\ [-3^2+(2.-4)]^2 &= (9-8)^2 = 1\\ [-4^2+(2.-3)]^2 &= (16-6)^2 = \underline{100}\\ & \qquad\qquad 357\\ -[(2.-3)+(2.-4)+(-3.-4)] &= \underline{4}\\ [(2^4)+(-3^4)+(-4)^4] &= \underline{353}\end{aligned}$$

(2) $2x^2-7xy+6y^2$; $4x^2-8xy+3y^2$; $2x^2-5xy+2y^2$
$(x-2y)(2x-3y)$; $(2x-3y)(2x-y)$: $(x-2y)(2x-y)$
L.C.M. $= \underline{(x-2y)(2x-3y)(2x-y).}$ Ans.

(3) Let $\frac{a}{b}=x$ and $\frac{c}{d}=y$.

Then $a=bx$ and $c=dy$.
Hence $ad=bdx$
and $bc=bdy$

and $\frac{ad}{bc}=\frac{bdx}{bdy}=\frac{x}{y}$

But $\frac{x}{y}=x\div y=\frac{a}{b}\div\frac{c}{d}$

$\therefore \frac{ad}{bc}=\frac{a}{b}\div\frac{c}{d}$

Where the letters denote any numbers.

$$\left(\frac{x}{(1-x)^2}+\frac{1}{1-x^2}\right)\div\frac{1+x^2}{1+x}$$
$$=\frac{x(1+x)+(1-x)}{(1-x)(1-x)(1+x)}\times\frac{1+x}{1+x^2}$$
$$=\frac{1+x^2}{(1-x)(1-x)(1+x)}\times\frac{1+x}{1+x^2}$$
$$=\frac{1}{(1-x)^2}$$

(4) (a)
$$\begin{aligned}7x-8y+22&=0\\ 11x-10y-4&=0\\ 77x-88y&=-242\\ \underline{77x-70y}&=28\\ -18y&=-270\\ y&=\underline{15}\\ 7x-120&=-22\\ 7x&=98\\ x&=\underline{14}\end{aligned}$$

$\underline{x=14;\ y=15.}$ Ans.

(b)
$$\begin{aligned}21x^2-36&=x\\ 21x^2-x&=36\\ x^2-\frac{x}{21}&=\tfrac{12}{7}\\ x^2-\frac{x}{21}+(\tfrac{1}{42})^2&=\tfrac{12}{7}+\tfrac{1}{1764}\text{ or }\tfrac{3025}{1764}\\ x-\tfrac{1}{42}&=\pm\tfrac{55}{42}\\ x&=\pm\tfrac{55}{42}+\tfrac{1}{42}\\ &=\tfrac{56}{42}=\underline{1\tfrac{1}{3}.}\text{ Ans.}\\ &=-\tfrac{54}{42}=-\underline{1\tfrac{2}{7}.}\text{ Ans.}\end{aligned}$$

Mensuration.

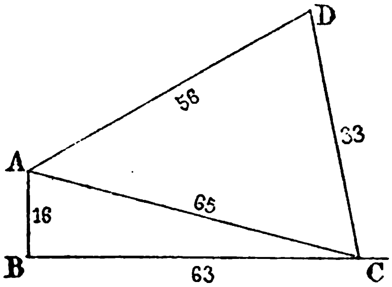
BOYS ONLY.

(Answer one question only.)

1. The sides of a quadrilateral ABCD are AB = 16, BC = 63, CD = 33, DA = 56; the angle ABC is a right angle. Find the area.

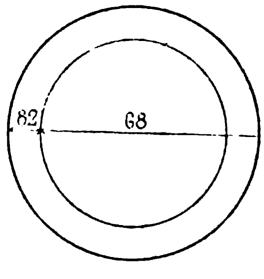
2. Find the area of a circular ring whose inner and outer diameters are 68 and 82. ($\pi=\frac{22}{7}$).

(1)



63 × 8 = 504, area of ABC.
$\sqrt{(63^2+16^2)}=\sqrt{4225}=65$ AC.
$\frac{65+56+33}{2}=77$
$\sqrt{77(77-65)(77-56)(77-33)}$
$=\sqrt{853776}$
$=924$, area of ADC.
$924+504=\underline{1428\text{, area of ABCD.}}$

(2)



$\frac{22}{7}(41+34)(41-34)$
$=\underline{1650.}$ Ans.

Arithmetic.

GIRLS ONLY.

(Answer three questions only, including the last, if you can.)

1. Find the income produced by investing £1,995 in 2¾ per cent. Stock at 99¾. [Neglect brokerage.]

2. At what rate per cent. per annum, simple interest, will £820 amount to £894 6s. 3d. in 2½ years?

3. 70 men pay into a sick club: 17 pay 1s. 6d. per week, 25 pay 1s. 9d., 20 pay 2s. 1d., and the remainder pay among them per week on the average £1 9s. 1d. Find the average weekly payment per man?

4. A sum of £89 12s. 1d. is divided among three persons in the ratio 1⅓, 2¼, 3⅛. Find each person's share.

(1) Income $=\frac{£1995\times2\frac{3}{4}}{99\frac{3}{4}}$
$=\frac{1995}{1}\times\frac{11}{4}\times\frac{4}{399}$
$=\underline{£55.}$ Ans.

(2) Interest = £894 6s. 3d. − £820 = £74 6s. 3d.
∴ Rate =

$$\begin{matrix} & £ & & £ & \\ £820 : & 100 & :: & 74\tfrac{5}{16} & : x\\ 2\tfrac{1}{2} : & 1 & & & \end{matrix}$$

$=\frac{2}{5}\times\frac{1}{820}\times\frac{100}{1}\times\frac{1189}{16}$
$=\underline{3\tfrac{5}{8}.}$ Ans.

(3)		s.	d.
	17 at 1s. 6d. =	25	6
	25 at 1s. 9d. =	43	9
	20 at 2s. 1d. =	41	8
	8 =	29	1
	70 pay	140	0

∴ 1 pays 2 shillings. Ans.

(4) $1\frac{1}{2} + 2\frac{1}{4} + 3\frac{1}{3} = 7\frac{1}{12}$

$7\frac{1}{12} : 1\frac{1}{2} :: £89\ 12s.\ 1d. : \underline{£18\ 19s.\ 6d.}$ Ans.

$7\frac{1}{12} : 2\frac{1}{4} :: £89\ 12s.\ 1d. : \underline{£28\ 9s.\ 3d.}$ „

$7\frac{1}{12} : 3\frac{1}{3} :: £89\ 12s.\ 1d. : \underline{£42\ 3s.\ 4d.}$ „

(*Two hours and a half allowed.*)

Needlework.

GIRLS ONLY.

(*One hour allowed for this exercise.*)

Darn on linen a cross-cut (¾ of an inch in length).

Arithmetic.

BOYS ONLY.

(*Answer three questions only, including the last, if you can.*)

1. Find the cube root of 177,504,328.

2. A school was open 210 days in the course of a year; on 20 stormy days the attendance was small, on 3 of these days ·25 of the scholars were absent, on 5 days ·35, on 8 days ·4, on 4 days ·45: find the average daily absence for the year, supposing that the average absence for the remainder of the days was ·2.

3. A square whose side is 16¼ feet, is covered with metal 1½ inches thick; find the cost of the work, if it costs £3 4s. to cover an area 13 feet broad and 52 feet long with metal 2½ inches thick.

4. A metal expands by ·17 of its bulk, when heated between two given temperatures; find to 3 places of decimals by how much of its bulk it contracts when cooled between the same temperatures.

(1)

177,504,328($\underline{562}$. Ans.

$5^3 = 125$

52504

$5^2 \times 300 = 7500$

$5 \times 30 \times 6 = 900$

$6^2 = 36$

8436 | 50616

$56^2 \times 300 = 940800$ | 1888328

$56 \times 30 \times 2 = 3360$

$2^2 = 4$

$\underline{944164}$ | $\underline{1888328}$

(2)

3 at ·25 = ·75

5 at ·35 = 1·75

8 at ·4 = 3·2

4 at ·45 = 1·8

190 at ·2 = 38·0

210 = 45·50

∴ 1 = $\underline{·216}$ Ans.

(3)

			s.	
Length 52	: 16¼	::	64	: x
Breadth 13	: 16¼			
Thickness 2½	: 1½			

$x = \frac{64}{1} \times \frac{65}{4} \times \frac{65}{4} \times \frac{3}{2} \times \frac{2}{5} \times \frac{1}{13} \times \frac{1}{52} = \underline{15s.}$ Ans.

(4) 1·17 : 1 :: ·17 : $\underline{·145}$. Ans.

Grammar.

BOYS AND GIRLS.

(*Answer questions 2 and 4, and one other question.*)

1. Analyse this passage:—

I *would* the great *world* grew like *thee*,
Who grewest not *alone* in power
And knowledge, but from hour to hour
In reverence and in charity.

2. Parse the words printed in italics in the previous question.

3. Take the words *Indestructibility; Re-admission;* and show the meaning and force of each syllable contained in them.

4. Give in your own words the substance of the following passage—

King Richard.

Barkloughly Castle, call they this at hand?

Aumerle.

Yea, my lord. How brooks your grace the air,
After your late tossing on the breaking seas?

King Richard.

Needs must I like it well. I weep for joy
To stand upon my kingdom once again.
Dear earth, I do salute thee with my hand,
Though rebels wound thee with their horses' hoofs:
As a long parted mother with her child
Plays fondly with her tears and smiles in meeting;
So weeping, smiling, greet I thee, my earth,
And do thee favours with my royal hands.
Feed not thy sovereign's foe, my gentle earth,
Nor with thy sweets comfort his ravenous sense.

* * * * *

Yield stinging nettles to mine enemies:
And when they from thy bosom pluck a flower,
Guard it, I pray thee, with a lurking adder,
Whose double tongue may with a mortal touch
Throw death upon thy sovereign's enemies.

5. Select from the above passage eight words which you know to be of foreign origin, and give their derivations.

6. Mention the chief writers of the age of Queen Anne, and give the names of their principal works.

(1) (*a*) Princ. sentence.
Subj.—I.
Pred.—would.
(*b*) Noun sentence.
Subj—The great world.
Pred.—grew.
Ext. of Pred.—like thee.
(*c*) Adj. sentence to *b.*
Subj.—who.
Pred.—grewest.
Ind. Obj.—in power and knowledge.
Ext. of Pred.—not alone.
(*d*) Adj. sentence to *b.*
Connective—but.
Subj.—[who].
Pred.—[grewest].
Ind. Obj.—in reverence and in charity.
Ext. of Pred.—(time) from hour to hour.

(2) *Would*— = wish. Verb, irreg., trans., act., ind., past., 1st sing., agreeing with its nom. *I.*
world—noun, com., collective, com., sing., nom. to *grew.*
thee—pronoun, pers., 2nd., sing., com, obj., gov. by *like.*
who—pronoun, rel., 2nd., sing., com., nom. to *grewest.*
grewest—verb, irreg., intrans., act., ind., pres., sing., 2nd., agreeing with its nom. *who.*
alone— = only. Adv. of deg. qualifying *grewest.*

(3) *Indestructibility.*
In—Lat. *in*, not.
de—Lat. *de*, down.
struct—from Lat. *struo*, I build.
i-bil—from Lat. *ible*, adj. termination signifying power.
i-ty—from Lat. *ity*, affix signifying abstract idea.
Whole word: Having the quality of *lastingness*, or that which prevents it from being destroyed.
Re-admission.
Re—from Lat. *re*, back or again.
ad—Lat. to.
mis—from Lat. *mitto*, I send.
sion—Lat. affix signifying state or condition.
Whole word: State of being sent or received in again.

(4) King Richard asked Aumerle whether the building they saw was Berkeley Castle. Aumerle answered that it was, and then asked the king how he enjoyed the land breeze after tossing on the rough sea.

King Richard replied that he liked it well, and expressed himself delighted to be in his own country once more. Then, turning to look at the ground, he accosted it as if it could hear him speak, saying that he greeted it with his hand, although those who opposed him were ploughing it with their war-horses' feet. And just as a mother is so filled with joy after being long parted from her child, that she alternately weeps and smiles, so he in like manner greeted his country again. He then begged the earth neither to yield food nor to give sweet smells to his enemies, but to grow for them only stinging nettles, and when they attempted to pluck from it a flower, to hide within its leaves a venomous reptile which, darting out its forked tongue, should inflict upon them mortal wounds.

(5) *Rebels*—from Lat. *re.*, back or again, and *bellum*, war; those who rebel.
favours—from Lat. *faveo*, I favour.
royal—from Fr. *roi*, a king; Lat. *rex*, a king, or *rego*, I rule.
Sovereign—from Lat. *super*, above, through Fr. *souverain.*
enemies—from Lat. *inimicus*; *in*, not, *amicus*, a friend.
double—from Fr. L. *duplus*, *duplex*—*duo*, two, *plico*, I fold.
Mortal—from Lat. *mors*, death.
comfort—from Lat. *con*, together, *fors*, *fortis*, strong.

(6) *John Locke*, mental philosopher. Chief work, 'An Essay on the Human Understanding.'

Gilbert Burnet wrote 'History of My own Times,' and 'History of the Reformation of the Church of England.'

Matthew Prior, poet; 'Alma' and verses.

Joseph Addison, essayist; 'Tatler,' and 'Spectator;' drama, 'Cato.'

Richard Steele; 'Tatler,' 'Spectator,' 'Guardian;' 'The Funeral,' 'The Tender Husband.'

Sir Isaac Newton, metaphysician and mathematician; 'Principia.'

Richard Bentley, critic; 'Dissertation on the epistles of Phalaris.'

Nicholas Rowe, dramatist; 'The Fair Penitent.'

Geography.

BOYS AND GIRLS.

(*Answer three questions only, including the fourth and sixth, if you can.*)

1. From the South of Asia project three large peninsulas, which in some respects resemble three on the South of Europe. Thus, on both Continents numerous islands are clustered round the Easternmost peninsula; the Central peninsula in both is cut off from the rest of the land by the highest mountain system in the Continent, and has a large island lying off its South Coast; and finally the Westernmost peninsula in both consists of a broad mass of table land separated from Africa only by a narrow strait. Explain the allusions in the above passage.

2. What are the principal vegetable products of the basins of the Mississippi, the Nile, and the Ganges?

3. Say what you know about *five* of the following places, viz.:—Kyber, Nagasaki, Chicago, Manhattan, Niphon, Herat, Shanghai, Titicaca, Corea, Port Elizabeth, Brooklyn, Kalahari, Quettah, Callao.

4. Explain, with diagrams, why there are two high tides daily; also why it is not high tide everywhere in Europe at the same time; and why the high tide of *to-day* happens about fifty minutes later than the corresponding one of *yesterday.*

5. Explain the terms Morning Stars, Saturn's rings, Jupiter's belts and satellites.

6. Draw a map of South America or of Hindostan.

(1) The three Asian peninsulas are Arabia, India, and Further India; the three English are Spain and Portugal, Italy, and Turkey and Greece. Round Further India are clustered Sumatra, and the other islands of the East Indian Archipelago, and round Turkey and Greece are clustered the Ionian Islands and numerous other islands. In Asia, India is cut off from the rest of the continent by the Himalayas and the Soliman Mountains, and has Ceylon at its southern extremity; and Italy is cut off from the rest of Europe by the Alps the highest mountains in Europe, and has Sicily at its apex. Spain and Portugal in Europe form a great tableland separated from Africa by the Strait of Gibraltar, while Arabia in Asia is of a similar character and is separated from Africa by the Strait of Bab-el-mandeb.

(2) The productions of the Mississippi may almost be said to be the productions of America. The States in its basin produce wheat, oats, rye, rice, sugar, tobacco, cotton, potatoes, sugar, maize, and barley.

The basin of the Nile produces rice, wheat, sugar, cotton, indigo and dates.

The basin of the Ganges produces rice, cereals, banana, pine apple and other fruits, poppy, indigo, tobacco, palms, banyan, teak, bamboos, and cotton.

(3) *Kyber*, an important pass between India and Afghanistan, through the Soliman Mountains, a little S.E. of Peshawar.

Nagasaki, oldest port in Japan.

Chicago, large town in Illinois, south end of Lake Michigan; corn and pork exporting town.

Manhattan, Manhattan Island, in the mouth of the Hudson, 13½ miles long, 1½ miles wide, covered by the City of New York.

Niphon, principal island of Japan.

Herat, fortified town in North of Afghanistan.

Shanghai, port in China, most important commercial city on the coast.

Titicaca, lake, 12,000 feet above the Pacific, in the Andes, near the Equator.

Corea, peninsula in E. of Asia, N. of China, 500 miles long, and 150 miles broad.

Port Elizabeth, port of Cape Colony, on western side of Algoa Bay.

Brooklyn, important city on mainland on Hudson River, opposite New York City, in U. S. America; port and residential quarter; 550,000 inhabitants.

Kalahari, uninhabited waste district in S. Africa, north of Orange River.

Quettah, fort in Beloochistan, occupied by British.

Callao, seaport of Peru; good harbour.

(4) [The candidate would draw the diagram found in every text book, showing the sun, moon and earth in a straight line.]

The moon travels round the earth in a day. As it attracts most the waters on the side of the earth nearest to it, on that side the waters are heaped up as it were, and form a high tide. It attracts the earth itself less, as it must move in a mass, and the waters on the opposite side are left in a heap. Two high tides, on opposite sides of the earth, are thus formed at the same time. As every portion of the earth's surface comes under the influence of the moon every day, every place will thus have two high tides daily.

The tidal wave formed in the great Southern Ocean finds its way up the Atlantic, and first reaches Spain and Portugal, proceeding northwards to the other countries of Europe.

While the moon is travelling the earth is proceeding in its orbit. The moon has therefore not only to travel round the earth, but to proceed along with the earth in its orbit, and it takes a day and fifty minutes for it to appear over the same place on the earth on each succeeding day. As the tide follows the moon it follows that the tide of to-day will be fifty minutes later than the tide of yesterday.

(5) Mercury and Venus, on account of their being inside the orbit of the earth, can never be seen at a great distance from the sun. When they are west of the sun they appear as morning stars.

Saturn, besides having satellites, has three luminous rings round it at a considerable distance from it, parallel to its equator. These are partially transparent, but throw a shadow on the planet, and also receive the shadow of the planet on the side turned from the sun.

Jupiter is always crossed by bands or belts. These belts vary in breadth and situation, and are supposed to be rifts in the gaseous atmosphere which surrounds it, allowing us to see the dark planet beneath.

Jupiter has four moons or satellites which are larger than the moon of the earth. They turn on their axes in the same time that they take to move round Jupiter. The velocity of light has been determined by means of these moons which are frequently eclipsed.

History.

BOYS AND GIRLS.

(*Answer three questions only.*)

1. Give in order the chief events, with dates, of the reign of James I.

2. What is meant by the Test and Corporation Acts, Catholic Emancipation, and the Repeal of the Corn Laws?

3. Write a short account of two of the following: Bolingbroke, Marlborough, Algernon Sidney, and Charles James Fox.

4. What have been the principal changes in the constitution of the House of Commons from the year 1830 to the present time?

5. Name the chief events which happened in England in the years 1715, 1745, 1780, 1797, 1846, and 1870.

(1)	Accession of James I.	1603
	Main Plot	1603
	Hampton Court Conference	1604
	Gunpowder Plot	1605
	Colonization of Virginia	1607
	Authorized Version issued	1611
	Degradation of Sir Edward Coke ...	1616
	Execution of Raleigh	1618
	Spanish Match broken off	1623
	Quarrel with Parliament	1624
	Death of James	1625

(2) By the Test Act (1673) no one could hold office without adjuring transubstantiation, taking the oaths of supremacy and allegiance, and receiving the Sacrament according to the rites of the Church of England.

The Corporation Act (1661) obliged all officers of corporate bodies to take an oath of non-resistance to high authority, and to take the Sacrament according to the rites of the Church of England.

The Catholic Emancipation Bill (1829) enabled Catholics to sit in Parliament and hold offices generally, except those of Regent, Lord Chancellor, and Lord Lieutenant of Ireland.

Repeal of the Corn Laws (1846). Restrictions were placed upon the importation of corn by a sliding scale of duties according to the price of English wheat. This pressed heavily upon the poor, and Sir Robert Peel succeeded in repealing the laws, and in substituting a small fixed duty for the scale then in use.

(3) Bolingbroke was a celebrated statesman of the reign of Queen Anne. He succeeded in accomplishing the disgrace of the Duke of Marlborough, and endeavoured to secure the succession of the Pretender on the death of the Queen. He managed to overthrow the Earl of Oxford, but his schemes were frustrated by the death of the Queen. He then fled to France and took service with the Pretender, but soon fell into disgrace. After receiving a pardon he returned to England, and although his estates were restored to him through Walpole's influence, he began to intrigue against him. He induced the Prince of Wales to rebel against his father. He wrote 'The Patriot King.'

(*b*) The Duke of Marlborough was first employed in intrigues between Charles II. and the French Court. During James's reign he concocted schemes for bringing over the Prince of Orange, and joined him on his landing, and was employed by William in Ireland. On the accession of Queen Anne he was made captain-general of the forces. He fought several campaigns in the Low Countries, and humbled the power of France in four great battles at Blenheim, Ramilies, Oudenarde, and Malplaquet. The strife between the Whigs and Tories, and the imperious conduct of the Duchess, led to his disgrace. He retired from office to Blenheim Park, which had been given to him by the country. He was one of the greatest military commanders this country has ever known.

(4) The Reform Bill of 1832 provided for the disfranchisement of many small boroughs and the better representation of new populous places and of counties. The franchise was extended to the middle classes generally. £10 householders in towns, and tenants paying £50 rental in counties, received the franchise.

In 1867 the second Reform Bill lowered the franchise still further. Household and £10 lodger suffrage in towns, and £12 rateable value suffrage in counties was introduced.

In 1884 the Representation of the People Act extended the household and lodger franchise to the counties, placed the United Kingdom on one basis, and increased the voters about 2½ millions.

In 1885 the Redistribution of Seats Act caused the absorption of a large number of small boroughs into the counties, added their representatives to the large boroughs and populous counties which were nearly all divided into single member constituencies, and created some new boroughs, the membership of the House of Commons being increased from 658 to 670.

(5) 1715.—Riot Act passed; first invasion of the Pretender, rising under the Earl of Mar; defeat of the Earl of Derwentwater at Preston.

1745.—Young Pretender's rebellion.

1780.—No-popery riots led by Lord George Gordon.

1797.—Mutiny at Spithead and the Nore; Bank Restriction Bill passed.

1846.—Repeal of the Corn Laws.

1870.—Passing of the Education Act. Treaty guaranteeing independence of Belgium agreed to.

Teaching.

BOYS AND GIRLS.

(*Answer two questions only.*)

1. Say what are the requirements of the Code under the heads 'English' and 'Geography' for the Third and Fifth Standards.

2. Make out a sketch of a collective lesson on one of these subjects:—

(*a*) A Farmyard.
(*b*) Tides.
(*c*) *For Infants.* The Season of Spring.
(*d*) *For Infants.* The Whale.

3. The Code requires that exercises in Mental Arithmetic 'should not involve large numbers, should deal with concrete as well as abstract quantities, and should be preparatory to the work of the next higher standard.' Give ten varied examples of Mental Arithmetic questions which fulfil these conditions, and which are suitable for the *Fourth* Standard.

4. Show how you would make the distinction between Transitive and Intransitive Verbs understood by scholars in the Fourth Standard, and how far it would help you to require the children to make or find illustrations of their own.

5. Sketch a progressive course of drawing on chequered slates for infants.

6. Explain any system with which you are acquainted for teaching physical exercises to infants.

(1) *Standard III.—English.*—To recite, with intelligence and expression, 60 lines of poetry, and to know their meaning. To point out nouns, verbs, adjectives, adverbs and personal pronouns, and to form simple sentences containing them.

Geography.—Physical and political geography of England, with special knowledge of the district in which the school is situated.

Standard V.—English.—To recite 100 lines from some standard poet, and to explain the words and allusions. To parse and analyse simple sentences, and to know the method of forming English nouns, adjectives, and verbs from each other.

Geography.—Geography of Europe, physical and political. Latitude and longitude. Day and night. The seasons.

In Standard V. maps and diagrams may be required to illustrate the answers given.

(2) (*a*) For the lesson on 'A Farmyard,' the teacher would require a picture of a farmyard, and of some of the things found in it. The lesson would deal with (1) its situation. (2) Its arrangements. (3) Its live contents. Under (1) the teacher would speak of its proximity to the farm house, in the midst of the farm, perhaps sheltered by trees, but certainly near a supply of water of some kind, either stream, or well, or pond. Under (2) of the buildings for horses, cattle, sheep; of the sheds, the ricks, the barns, the pond, the drainage, the place for refuse. Under (3) of the live stock of various kinds, of the implements needed on the farm, of the necessity for cleanliness and order, for the welfare of the stock, and the easy working of the farm.

(*b*) For tides the teacher would need the blackboard and its accessories; a good map illustrating the tides; three globes of varying sizes would also be useful.

The lesson would be introduced by a reference to what is noticed at the seaside, and an enquiry if anyone knew the cause of the phenomenon. A few general observations about *attraction* would then be made, and the principle illustrated. This would then be applied to the sun, moon, and earth. The diagram would be shown, and the relative positions shown on board. An exaggerated drawing of the appearance of the tides would be drawn, showing *two high tides* on opposite sides of the earth at the same time. The moon would be followed, and the daily rotation of the earth shown to account for high tide being fifty minutes later each day. Then attention would be drawn to the fact of there being low tides at the same time as high tides, but in different places; and, lastly, the difference between spring and neap tides would be shown, with the cause. Reference to the value of the continual movement might conclude the lesson.

(*c*) This lesson would be best given to little children in spring, when they would be able to tell what they saw around them without too great an effort of memory.

The teacher would show a plant just bursting into leaf, an early flower (primrose, snowdrop, cowslip, or violet) would call attention to the trees and the grass. Mention would be m of the passing away of the snow, the lengthening of the day, the warmer air—now no need for muffs, cloaks, great-coats, &c. Gentle rain instead of snow. The warmth and the rain cause the trees to burst into leaf, and the flowers and plants to grow. Lambs are found at play; children also go out for walks. Everything joyous and happy after dreary winter has gone away.

Lesson would be given chiefly to train the faculty of observation.

(*d.*) The above will serve as specimens of sketches of what lessons should be.

3. Standard V. does practice, simple proportion, and bills of parcels and simple fractions. Standard IV., weights and measures and compound rules, money. Mental arithmetic questions should include all these.

On Standard IV. work.

1. How many halfpenny stamps can I get for 3s. 6½d.?
2. What will 1 cwt. of sugar cost at 3d. per lb.?
3. How many times is 3s. 4d. contained in £5?
4. Nine times 2s. 8¼d.?

On Standard V. work.

5. What is the third of a shilling; the sixth of a £; the tenth of a ton; the fourth of a mile, in yards?
6. Eight pairs of gloves at 2s. 6d., and 3 at 3s.?
7. If six pairs of slippers cost 15s., how many pairs can be got for 17s. 6d.?
8. Nine men earn 18s. 9d. a day; what will four men earn in three days?
9. Which is the greater, ⅓ or ¼?
10. What is the difference between ¼ of a yard and ⅙ of a foot?

(4) I should write three or four sentences down on the board containing only a noun and an intransitive verb, as:—Lions roar. Fishes swim. I should then ask for a number of sentences of a similar character. This would give the children something to do, and would call for the exercise of thought. It would help in keeping up the interest of the class, and prevent idling, as each promiscuously would be given something to do. The practice would be followed in every part of the lesson. Next, I should write such part sentences as these on the board:—Father brought, William broke, and ask what each needed. A ready answer would be given.—what father brought, what William broke. This would lead to a comparison of the verbs,—some making sense alone, others needing a noun to complete the sense. After numerous examples I should give the names, and show how the names explained the thing they were meant for. Then would follow questions asking for sentences with transitive and intransitive verbs.

(5) (*a*) Dotted vertical lines, then chain lines, then whole lines, one side of square, then two sides, then two half sides, then one and a half sides.

(*b*) Same as (*a*), but horizontal lines.

(*c*) Slant lines from corner to corner.

(*d*) Combination of vertical and oblique, then horizontal and oblique, then all three.

(*e*) Combinations of above to make simple figures, as, a see-saw, a balance, a scale.

(*f*) Parallel lines, horizontal, vertical, slant (as for writing guides, and chequered panes).

(*g*) Square, rhombus, oblong, rhomboid, triangle.

(*h*) Design: growth of plants, trees, leaves, flowers.

(*i*) Common objects—hat, cap, bonnet, teapot, cup and saucer, can, flag, spade, fork, key, candlestick, &c.

(6) [This question will admit of various answers. The following relates to musical drill].

Musical drill in our school consists principally of movements of various parts of the body to music after words of command have been given. The following are some of the movements:—

(*a*) Twisting hands outwards and inwards when by sides; same with elbows by sides and forearms stretched out; the same with hands stretched out to sides and level with shoulders; when stretched above the head; when stretched to the front.

(*b*) Using arms like a wheel alternately; bending; hands to chest, elbows by sides; then raised above the head.

(*c*) Hands on shoulders, throw outwards; same on chest, throw forwards.

(*d*) Left foot forward, swing.

Similar exercises to the above are given with other parts of the body, as right foot first, one hand and one foot, both hands and a foot, swinging to right, to left, &c.

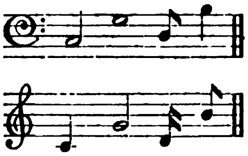
Rings and mazes are also formed, and various movements in marching drill.

END OF FIRST YEAR.

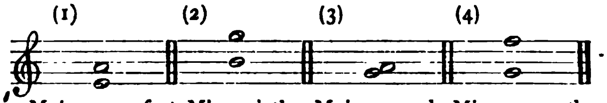
Music.

STAFF NOTATION.

1. Write the following an octave higher on the Treble clef, halving the value of every note:

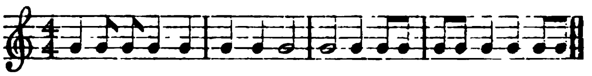


2. Write below each of the following intervals its name (major second, &c.):



Major or perfect fourth. Minor sixth. Major second. Minor seventh.

3. Add bars to the following in accordance with the time signature:



TONIC SOL-FA NOTATION.

1. Write (1) a three-pulse measure, and (2) a four-pulse measure.

(1) | : : | : : ||

(2) | : | : ||

2. Write the names of the following intervals:

(1) *soh* to *ray*^{1}. Major or perfect fifth.
(2) *te*$_1$ to *soh*. Minor sixth.
(3) *te* to *ray*^{1}. Minor third.
(4) *fah* to *me*^{1}. Major seventh.

3. Write the following an octave higher, doubling the value of each note:

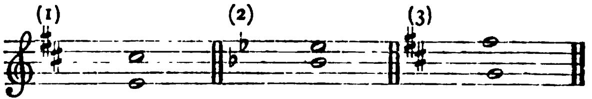
| s_1 :l_1 | t_1 :— | r :s ||

| s :— | l :— | t :— | — :— | r^1 :— | s^1 :— |

END OF SECOND YEAR.

STAFF NOTATION.

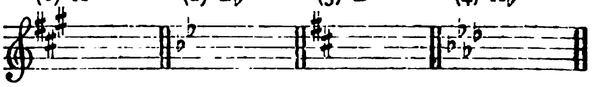
1. Write below each of the following intervals its name (major third, &c.):



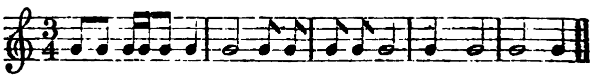
Major sixth. Major or perfect fourth. Major seventh.

2. Write the signatures of the following major keys (treble clef):

(1) A (2) B♭ (3) D (4) A♭



3. Add bars to the following in accordance with the time signature:



TONIC SOL-FA NOTATION.

1. What is the mental effect of (1) *me*, (2) of *te*, (3) of *soh*? (1) Tranquil, peaceful. (2) Piercing, expectant. (3) Bold, bright.

2. Write the names of the following intervals :

(1) *ray* to *te*.	Major sixth.
(2) *soh* to *doh*¹.	Major or perfect fourth.
(3) *doh* to *me*.	Major third.
(4) *me* to *doh*¹.	Minor sixth.

3. Write (1) a six-pulse measure, (2) a four-pulse measure, (3) a nine-pulse measure.

(1) | : : | : : ||

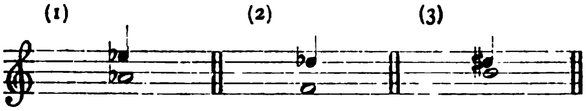
(2) | : | : ||

(3) | : : | : : | : : ||

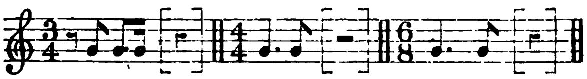
END OF THIRD YEAR.

STAFF NOTATION.

1. Write above (1) a perfect or major fifth, above (2) a minor sixth, above (3) a major third.



2. Complete each of the following bars by adding one *rest* at the end :



3. State (briefly) the meanings of the following terms :

(1) Ad libitum.	At will or pleasure.
(2) Tempo Primo.	In the original time.
(3) Vivace.	Lively, quick.
(4) Forte.	Loud.

TONIC SOL-FA NOTATION.

1. Write a minor sixth above each of the following notes : (1) Above *doh—la*. (2) Above *ray—ta*. (3) Above *soh—ma*¹.

2. Write (in figures) over each note and rest in the following passage its value in pulses or fractions of a pulse :

1 ½ ½ ½ ½ ½ ¼ ¼ ¾ ¼ ½ ½ 1 ½ ½ 2

| s :- .m | s .l : t .l,t | d¹.,s : f .r | m : .r | d :— ||

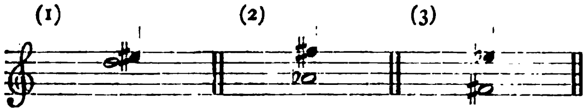
3. State (briefly) the meanings of the following terms :

(1) Ad libitum.	At will or pleasure.
(2) Tempo Primo.	In the original time.
(3) Vivace.	Lively, quick.
(4) Forte.	Loud.

END OF FOURTH YEAR.

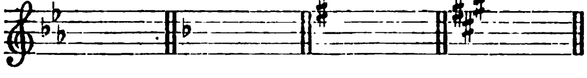
STAFF NOTATION.

1. Write above (1) an augmented second, above (2) an augmented sixth, and above (3) a diminished seventh :

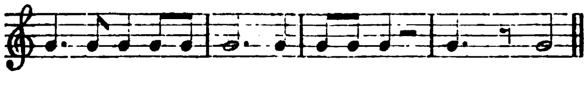


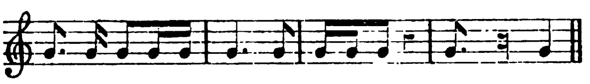
2. What minor keys are shown by the following signatures?

(1) C minor. (2) D minor. (3) E minor. (4) F♯ minor.



3. Re-write the following, halving the value of every note and rest :





TONIC SOL-FA NOTATION.

1. Write an augmented second above each of the following : (1) *soh—le*. (2) *doh—re*. (3) *fah—se*.

2. In the minor mode (1) which note is the tonic, (2) which is the dominant, (3) and which is the minor or occasional seventh? (1) *lah*. (2) *me*. (3) *soh*.

3. Re-write the following, halving the value of each note and rest :

| d :- .r | m : s .f | m : | : d ||

| d .,r : m .s,f | m . : .d || ◆

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music.

DIVISION III.—STANDARDS III. AND IV.

CODE REQUIREMENT.

Ear Test.

To imitate to '*laa*,' and afterwards name any three consecutive tones of the scale, which the Examiner may *twice* sing to *laa* (or play), each time first giving the *Doh* chord, or the scale.

Example :—Examiner sings d m s d¹ s m d. Then to 'laa' he sings s f m. The children then repeat to *laa*, and afterwards give the Sol-fa names.

This test should only be applied to the more advanced children of this division.

108. Methods of practising ear exercises were fully described in sections 59 to 68. In those sections it was stated that success depends upon the teacher's fluency in giving tests, and that the power of vocalising, *i.e.*, singing to *laa* instead of using the sol-fa names, is intimately associated with the power of telling by ear. Vocalising exercises were described in section 87.

109. Systematic ear training should embrace :—

(1) Demonstrations of mental effects.
(2) Practice of singing modulator voluntaries or unfamiliar exercises to *laa*.
(3) Appeals to the sense of contrast.
(4) Exercises in telling which of two or three announced phrases is sung.
(5) Exercises that the dullest pupils can tell.

110. It is useless to dogmatically state that this or that scale tone has a sad or a bright effect. Pupils must be taught to realise effects. On the other hand, it is unwise to invite descriptions from children unaccustomed to express their sensations precisely and possessing only a limited vocabulary. The best plan is to give a choice of words expressing widely different effects. Thus, supposing the teacher wishes to impress upon the class the calm and tranquility of me in such a phrase as—

Slowly and Softly.

|| m :- .m | f : m | r : l | s : m | d :— | r :— | $\overset{\frown}{m}$ ||

he may ask the class whether the last tone (me) was bold cheerful, and bright, or soothing and a little sad.

111. The only vocalising exercise called for here in addition to those described in section 87 is one that directly prepares for the form of the ear test given to this division. The teacher announces that he will require the class to sol-fa and then to vocalise the three tones (in stepwise succession) he now names. The Doh chord is then sung by the class and the three tones are sung to sol-fa names. Then the Doh chord is repeated by the class and the phrase is sung to *laa*. As skill is gained the sol-faaing may be dispensed with. But the Doh chord should always be sung not only before every exercise but between the repetitions of the same exercise The tests given below will provide suitable specimens.

112. Observation is greatly aided by appeals to the sense of contrast. The class sings, say, to sol-fa names **s f m** and the teacher (inviting the class to notice what he sings), vocalises either **s l s**, **s f d**, **s s s**, and asks whether the same tones were sung by him as were sung by them.

113. Another means of encouraging pupils to think and to believe that they can tell by ear, is to announce that either *this* phrase or *that* phrase will be sung. The pupils then know that one of two things must happen. At first there should be the widest difference between the phrases announced for choice, say for instance **l t d'** and **m r d**. Gradually phrases more like one another should be introduced and the choice may be widened to three or more phrases.

Phrases widely different

l t d' and **m r d**
f m r „ **s l t**
d' t l „ **d r m**

Phrases often confounded

m f s and **r m f**
r m f „ **l t d'**
t l s „ **m r d**
f m r „ **d t_1 l_1**
f s l „ **s l t**

114. The dull pupils should on no account be given up as hopeless. At every lesson some ear tests of great simplicity should be given to encourage such pupils to try to improve. Thus the teacher may ask. Do I sing up or down? How many *dohs* and *sohs* do I sing? Do I sing **d s m** or **d m s**?

115. It is often best to begin an ear telling practice by silencing the best pupils. This can be done on the following plan :—

Whole class to stand. Pupils told to hold up hands if they think they have found the notes of a somewhat difficult test. Of those whose hands are raised one is asked for his answer. If he is right he is told to sit down and not to answer further questions. This process is repeated again and again, each time with a new test. In this way an active teacher can quickly silence the sharpest pupils. For those left standing easier tests are devised until only the residuum prescribed for in section 114 remain.

116. The note appended to the Code requirement states that this test should be applied to only the more advanced children of this division. What proportion of a class should be expected to tell correctly tests of the kind described is a moot point. After many opportunities of testing the work of good teachers of singing in classes of average children, the present writer believes that if 25 per cent. of a class can answer correctly two tests out of three such a result should be considered highly satisfactory.

Graduated Ear Exercises.

These can also be used as vocalising exercises. See Section III. above. At first pupils may be told the name of the first note.

Beginning on **doh**.

d r d | d r m | d r r | d d r | d d t_1 | d t_1 d ||

Beginning on **me**.

m f m | m f s | m r d | m r r | m f f | m r m ||

Beginning on **soh**.

s f m | s l s | s f f | s s f | s l l | s f s | s l t ||

Beginning on **doh'**.

d' t d' | d' t l | d' t t | d' d' t | d' r' d' | d' r' r' ||

Groups low in the scale.

d r m | m f s | s f m | d t_1 l_1 | r m f | m r d | f m r }
r d t_1 | r m r | f m f | r d r ||

Groups high in the scale.

l t d' | s l t | d' t l | t l s | l s f | f s l | t d' r' }
d' t d' | l s l | l t l ||

Difficult to tell.

m f s | l s f | t l s | r m f | f s l ||

117. It must be ever borne in mind that the tones of an ear test derive their effects entirely from their relation to the Doh chord. If the Doh chord is not properly given, or if the pupil is inattentive to it, the tones of an ear test are heard only in relation to one another. Thus supposing a teacher sings a Doh chord and then slowly vocalises **t l s**, and not being satisfied with the answers given vocalises the test again, this time without first singing the Doh chord. The best pupils will now probably say that the tones are **m r d**. They will hear the tones only in relation to one another and not at all to the long past Doh chord.

(*To be continued.*)

The New Syllabus.

MALES.

THE Syllabus for the examination for Certificates has just been issued. The examination will commence on Monday the 9th of December at 3 p.m. The changes are very few. In regard to the grouping a new combination has been formed, which may be any two of the following, one language, one science, economy. As before, all candidates must take (a) and (b) and they may take two other groups, but no more. Acting teachers who have not passed with credit in one of the two immediately preceding years in either or both groups (c) and (d) must take it or them up again. Acting teachers who have not been examined in one of the two immediately preceding years, or having been examined have failed to obtain a certificate must take up both groups (c) and (d).

Each student and acting teacher must have learned 300 lines of poetry from the works of Milton, Byron, or Wordsworth. Each acting teacher will be called upon to repeat some part at the annual inspection of his school for the first year's Certificate, and for the second, 300 lines from a play of Shakespeare. The reading for the first year will be Shakespeare's Tempest or Scott's Ivanhoe, the reading for the second year will be from the Golden Treasury of Songs and Lyrics, Book IV., or from Trench on the Study of Words. Acting teachers as well as students will read before the Inspector from the prescribed books and also from another book which he will bring with him.

Lock's Thoughts concerning Education sections, 140 to 190 inclusive, are set down for study in the second year. The books selected for grammatical study in the first year are Gray's Odes and Elegy, and Bacon's Essays, 1 to 26; and in the second year Shakespeare's Macbeth, Gray's Odes and Elegy. In the succeeding year the books are Shakespeare's King Richard II., Tennyson's Lancelot and Elaine and Bacon's Essays 1, 2, 4, 5, 9, 11, 14—19, 21, 24, 25, 27—32, 36, 38, 39, 50.

The Geography for the first and second year is slightly altered. The general geography of Europe is prescribed. Sketch maps such as would be drawn by a teacher in the illustration of lessons may be required of the British Isles, France, Italy, and Switzerland. The special period of history is from 1685 to 1788. The only change in the Algebra is that for the second year where the word integral is inserted before index. The Binomial Theorem is now only required in the case where the index is a positive integer.

The Latin books for 1889 are, Cæsar's Gallic War, Book III., Virgil, Æneid, Book I. The Greek books are Xenophon, Cyropædia, Book V., Homer, Iliad, Book VI.

The French Books for 1889 are, Souvestre's Un Philosophe sous les toits, Racine's Iphigenie, and the German books, Grimm, Kinder und Hausmärchen, and Schiller, Wallenstein (first part). In 1890 the French passages will be taken from George Sand, La Mare au Diable, Molière, Le Misanthrope, and the German passages from Goethe, Götz von Berlichingen, and Schiller, Die Jungfrau von Orleans.

The regulations for the examination of Science in Training Colleges have been entirely remodelled during the past year. The subjects which can be studied are the same and the curriculum is not altered except in the case of Mathematics. The main difference between the old regulations and the new is in the fact that whatever subject is taken it must be continued over the two years of residence as no one will be allowed to attempt the paper for the advanced stage unless he has been previously successful either at the May examination or at the Training College in the elementary stage of the subject. Male candidates are restricted to two subjects and female candidates to one, as previously. The detailed Syllabus for the Sciences will be found in the Science and Art Directory.

FEMALES.

THE Syllabus for Female teachers for 1889 contains but few alterations. In regard to reading and repetition from memory it will be necessary in future for each acting teacher to have learned 300 lines from the works of Milton, Byron, or Wordsworth, which she will be called upon to repeat upon the annual inspection of her school. The students of the first year, and acting teachers taking first year's papers, will be expected to read passages from the Tempest, or Charles Lamb's Essays of Elia; the students of the second year, and acting teachers taking second year's papers, from the Golden Treasury of Lyrics, Bk. IV., or from Scott's Woodstock. Under the head of School Management, for the first year, the following words are added: 'The methods and principles of infant teaching and discipline,' Art. 109 (e) and (f). For the second year Pestalozzi has been replaced by Locke's 'Thoughts concerning Education,' sections 140 to 190 inclusive. The parsing and analysis of passages from Byron's 'Childe Harold,' Canto III., and Macaulay's 'Essay on Moore's Life of Byron' in the first year, and the analysis, grammar, and paraphrase of passages from Shakespeare's Macbeth. The language, style and allusions in Macbeth, and Bacon's Esaays, 1—26. There is no change in regard to the Arithmetic, the Domestic Economy, or the Vocal Music. The special books prescribed for German, French, Greek, and Latin are the same as those for the Male candidates.

Science Notes.

THE reports of the examiners on the results of the Science Examinations held in April, May, and June, 1888, by the Science and Art Department, have just been issued. It is a pamphlet of 52 pages, and contains criticisms on the answers to 15 of the subjects. These reports are of importance to the teachers, and will certainly be carefully studied by them. There are, however, some points of more general interest, and to a few of these we draw attention.

It is pleasing to note that there has been a large increase in the number of those taking stages I., II., and III. of Mathematics, though the effect of it seems to be a falling-off in the percentage of passes. We hope there was no attempt to raise the standard on account of the number presenting themselves. The examiners say the papers are as good as they were the year before last, and better than they were four years ago. Improvement is still desirable, particularly in the way of neatness and accuracy.

The examiner on the subject of Applied Mechanics and Steam reports that the results were, on the whole, satisfactory. He then prints about 17 of the questions set, and makes remarks upon the answers. The criticisms, however, rarely amount to more than: 'This was badly answered, except in a few instances.' 'Some excellent answers to this question.' Now, if it is worth while printing a question six or seven lines long, it is surely worth while saying something about it which will be useful and instructive to the teacher or the student, or both. The teacher will never object to being shown what may be of service to him. What we want to know is not that many answers were bad and many good, but why they were good and how the bad ones could have been made better.

The report on the examination in Physics is short but to the point. Bad text books, books in which there are mistakes which the pupils have not the ability to detect, but which they believe and reproduce, are at the bottom of much of the mischief. The same thing is true in other branches. The examiner in Geology says that some of the candidates still call corals insects.

The report upon the examination in Physiology and Biology is as detailed and precise as on former occasions. Complaint is made that the teaching is often loose, general, and indefinite, and lacks precision. One is sorry to hear that of the 29 who took the honours paper only three were summoned to the practical exercise, and all three were rejected. Considering that in other subjects excellent papers we done in honours, and seeing no reason why men taking up Physiology should be specially dull or incapable, one is almost driven to the conclusion that the requirements for a pass in honours in Physiology are beyond what can be fairly expected under the circumstances, and beyond what does actually satisfy the examiners in other subjects. A high standard should, no doubt, be insisted on; but to insist upon too much is to discourage the study of the subject. Men will, if they are wise, cease striving after the unattainable. Could not the examiners say more precisely what they want for a pass in Honours, and how it can be acquired. Our object is not to find fault. The criticism of the answers in Elementary and Advanced Physiology is most admirable. No pains have been spared to help the teachers to teach better and the pupils to answer better.

The most useful suggestion is given to the candidates for honours in Botany. It is said that the majority of the failures were due to the unsatisfactory descriptions given of the specimens; that several of the rejected candidates would have passed if they had shown any ability in observing and describing the specimens, and referring them to their natural orders.

The criticisms upon the answers to the questions in Agriculture are exceedingly good. We should recommend all who intend to take this subject next year to study them carefully. It is very gratifying to read the following:—'In our present examination for honours we have 57 papers, which for breadth of accurate knowledge of agriculture cannot be equalled in any agricultural examination either in this kingdom or in the colonies. I heartily congratulate the Department upon the eminent success which has attended the work of their widely-spread body of teachers, and I feel that, as a simple act of justice to them, the excellence of their work should be clearly recognised without hesitation or reserve.'

These remarks are written by one who is actually acquainted with the facts. They may be taken as an answer to some of the unworthy aspersions sometimes indulged in by unfriendly critics of the work done in the science classes in connection with the Science and Art Department.

⁂

AT the last meeting of the Statistical Society Mr. Giffen read a paper in which he dealt with changes in prices and incomes. He pointed out that between 1850 and 1873 both commodities and money increased in about the same degree. After the latter date commodities went on increasing as before, while there was a check to the increase of money. This has lead to an increase in the purchasing power of the sovereign. More work has to be done by it; it commands more in exchange. Hence a general fall in prices. This appreciation of gold becomes a serious thing for those persons or countries who have debts to pay. They have to supply more commodities than before for the same money. They benefit, it is true, by lower interest, but the balance of advantage is against them. Where debts increased much more rapidly than population, as in France and some Australian colonies, and the Argentine Republic, the effects of the appreciation of gold may become the cause of serious trouble. As to the future, we may expect a moderate appreciation to continue. To prevent it, or even to check it, there must be an enormous development of gold mining. But everything that economises gold currency tends in the same direction. The issue of one pound notes is surely only a question of time. The objections to them are unscientific and baseless. The impossibility of an unvarying standard of value suggests the idea of giving options in the case of sums to be paid at distant dates. Instead of binding himself to pay £100 in 1938, a merchant might bargain to have the right to substitute a certain quantity of other commodities. Many mischiefs might have been avoided if all concerned had realised, ten or fifteen years ago, what was likely to happen in money, and good will be done now if the future possibilities are steadily kept in view.

Query Column.

RULES.

1. **Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.**

2. **No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.**

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, **and on one side of the paper only.**

5. Replies will not be sent through the post.

6. Queries must reach the office ***not later than the 12th of the month***, **or they cannot be attended to in the following issue.**

⁂ All communications for this column should be addressed—'***The Query Editor,' The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.***

General.

1. PATUER.—Use *Casey's* 'Euclid,' or *Mackay's*, for the Euclid, 4-6 and 11. *Wilson's* will do well for the Solid Geometry. *Richardson's* 'Geometrical Conics' will cover all you want beside.

2. BEES.—If we meet with a manual we will tell you of it. No doubt there is one.

3. STUDENT.—There is a manual on the very subject published by Hughes, 4 Pilgrim Street, Ludgate Hill.

4. J.G.—Get the instructions from the S. K. Department, and then set about drawing upon the blackboard at once with the view of being ready next autumn. Put a saucepan (say) on a table, sketch it on a piece of paper, and then make an enlarged drawing of it upon the board without referring to the sketch. Practise in the same way with other articles.

5. NEMO.—Give details. We cannot refer specially. Theory and practice and history are all dealt with more or less in *Sully's* 'Handbook of Psychology,' *Fitch's* 'Lectures on Education,' *Langton's* 'School Management.'

6. BANOVEAN.—The large hand is bold and clear. The down strokes are too heavy, the slopes are not equally inclined. 65 per cent. The small hand is also firm and promising. The capitals are weak. Pay attention to the heights of the strokes, and write less upright. 70 per cent.

7. S. J. D.—What you want is the topography of the district, a small country geogaphy will give the other details. They can be got for a few pence each.

8. STUDENT.—You have written out the answer to your question. Do you want the answer explained? The volume occupied by a gas depends upon its temperature and pressure. If the volume decreases while the temperature remains the same then, by Boyle's law, the pressure must have increased correspondingly. $VP = V^1P^1$; $4 \times 15 = 3 \times x$; $x = 20$; hence the additional pressure must be that of 5 lbs. per sq. inch. Now, the pressure upon a body immersed in water will increase with the depth and be measured by the weight of the vertical column of water upon an area of a sq. inch. A column of water 11½ feet high, 138 inches, and one inch in section, contains 138 cubic inches, and therefore weighs about 5 lbs.

9. ENQUIRER.—No details are given which would enable us to answer the first three questions. A second class science certificate does not qualify you to *earn* payments upon results. Get a first. Large hand good; 80 per cent. Small hand good, 85. Get *Cowham's* Copy Books, especially numbers 9 to 15.

10. G. R. TUNSTALL.—*Huxley's* 'Physiography,' Macmillan. 'Agriculture,' by *Tanner*, Macmillan.

11. F.O.—Opinions differ considerably as to how such passages should be taken. An examiner is bound to accept any rational system of parsing and analysis. *Let but*, means if only, and the clause is therefore conditional, the principal sentences are those following 'And.' *Pardon me*, can be taken as a parenthesis. *Hear* is of course the infinitive. *Mean* and *go* would be taken as infinitives by some, by most perhaps, *would* and *do* would be taken as auxiliaries.

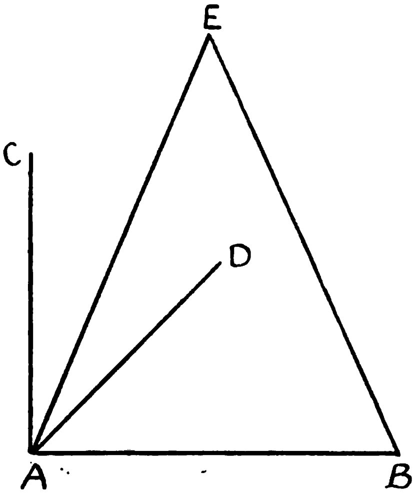
12. G. W. P.—The good ones are too dear, and the bad ones are worthless. Do not buy one. Borrow one or get one from a library. Private students ought not to think of getting one at first. Yes, certainly, many do so. Yes. For Plane Geometry, solid, and conics, see the answer to PATUER in this month's queries.

13. W. P. WILLIAMS.—Yes, we believe it does.

14. ÆNEAS.—If you are using the elementary text book you should go through it to be fully prepared. It does not contain too much. We cannot answer the second part, they would if you took them while in college.

Geometry.

1. J. H. B.—Construct an isosceles triangle which shall have one-third of each angle at the base equal to half the vertical angle. (*Todhunter.*)



Take any straight line AB. At the point A draw AC at right angles to AB. (I. 11.)

Bisect the angle BAC by the straight line AD, and bisect the angle CAD by the straight line AE. (I. 9.)

Then the angle BAE is equal to three-fourths of a right angle.

At the point B make the angle ABE equal to the angle BAE. (I. 23.)

Then ABE shall be the triangle required.

Proof.—The angles ABE, BAE are equal to a right angle and a half, (Con.)

∴ The angle AEB is equal to half a right angle; (I. 32.)

Thus half of the angle AEB is a fourth of a right angle, and is therefore equal to one-third of each of the angles ABE, AEB.

Q. E. F.

Trigonometry.

1. W. J. H. P.—Find the area of a triangle :—

(1) In terms of the perpendiculars p, q, and r, let fall from the angular points to the opposite sides. (2) In terms l, m, and n, the lines let fall from the angular points to the middle points of the opposite sides. (*Science and Art*, 1884.)

(1) Let a, b, c represent the sides of the triangle.

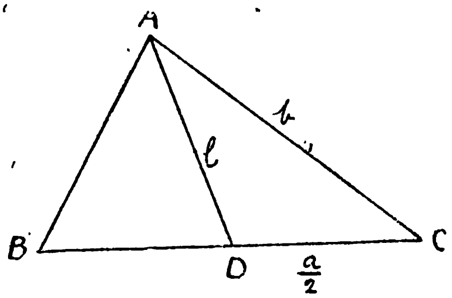
$$\text{Then, area} = \tfrac{1}{2}ap = \tfrac{1}{2}bq = \tfrac{1}{2}cr,$$

$$\left.\begin{aligned} \therefore\ a &= \frac{2\text{ Area}}{p} \\ b &= \frac{2\text{ Area}}{q} \\ c &= \frac{2\text{ Area}}{r} \end{aligned}\right\}$$

$$\begin{aligned} \text{Area} &= \tfrac{1}{4}\sqrt{(a+b+c)\,(b+c-a)\,(c+a-b)\,(a+b-c)} \\ &= \tfrac{1}{4}\sqrt{16\text{ Area}^4\left(\frac{1}{p}+\frac{1}{q}+\frac{1}{r}\right)\left(\frac{1}{q}+\frac{1}{r}-\frac{1}{p}\right)\left(\frac{1}{r}+\frac{1}{p}-\frac{1}{q}\right)\left(\frac{1}{p}+\frac{1}{q}-\frac{1}{r}\right)} \\ &= \text{Area}^2\sqrt{\left(\frac{1}{p}+\frac{1}{q}+\frac{1}{r}\right)\left(\frac{1}{q}+\frac{1}{r}-\frac{1}{p}\right)\left(\frac{1}{r}+\frac{1}{p}-\frac{1}{q}\right)\left(\frac{1}{p}+\frac{1}{q}-\frac{1}{r}\right)} \end{aligned}$$

$$\therefore\ \text{Area} = \frac{1}{\left(\frac{1}{p}+\frac{1}{q}+\frac{1}{r}\right)\left(\frac{1}{q}+\frac{1}{r}-\frac{1}{p}\right)\left(\frac{1}{r}+\frac{1}{p}-\frac{1}{q}\right)\left(\frac{1}{p}+\frac{1}{q}-\frac{1}{r}\right)}.$$

(See *Capel's* 'Easy Steps in Trigonometry,' Chapter XXIII., in our issue for November, 1887.)



$$\text{(2)}\quad AD^2 = AC^2 + CD^2 - 2AC.CD\cos C,$$

$$l^2 = b^2 + \left(\frac{a}{2}\right)^2 - 2b.\frac{a}{2}.\cos C$$

$$= b^2 + \frac{a^2}{4} - ab.\frac{a^2 + b^2 - c^2}{2ab}$$

$$= b^2 + \frac{a^2}{4} - \frac{a^2 + b^2 - c^2}{2}$$

$$= \frac{4b^2 + a^2 - 2a^2 - 2b^2 + c^2}{4}$$

$$\therefore\ 4l^2 = 2b^2 + 2c^2 - a^2; \quad (1)$$

$$\text{Similarly, } 4m^2 = 2a^2 + 2c^2 - b^2, \quad (2)$$

$$4n^2 = 2a^2 + 2b^2 - c^2. \quad (3)$$

$$4l^2 - 4m^2 = 3b^2 - 3a^2. \quad (4)$$

$$\begin{array}{rl} (1) & \left.\begin{array}{l} 4l^2 = 2b^2 + 2c^2 - a^2 \\ 8n^2 = 4b^2 - 2c^2 + 4a^2 \end{array}\right\} \\ (3) & \\ \hline & \left.\begin{array}{l} 4l^2 + 8n^2 = 6b^2 + 3a^2 \\ 8l^2 + 8m^2 = 6b^2 - 6a^2 \end{array}\right\} \\ (4) & \\ \hline & -4l^2 + 8m^2 + 8n^2 = 9a^2 \end{array}$$

$$\therefore\ a^2 = \frac{8m^2 + 8n^2 - 4l^2}{9};$$

$$\text{Similarly, } b^2 = \frac{8n^2 + 8l^2 - 4m^2}{9},$$

$$c^2 = \frac{8l^2 + 8m^2 - 4n^2}{9}.$$

$$\text{Area} = \tfrac{1}{4}\sqrt{s(s-a)(s-b)(s-c)}$$

$$\text{Area}^2 = \tfrac{1}{16}[s(s-a)(s-b)(s-c)]$$

$$= \tfrac{1}{16}(2a^2b^2 + 2b^2c^2 + 2c^2a^2 - a^4 - b^4 - c^4)$$

$$= \tfrac{1}{16}[a^2(2b^2 - a^2) + b^2(2c^2 - b^2) + c^2(2a^2 - c^2)]$$

$$= \frac{1}{16.81}[(8m^2 + 8n^2 - 4l^2)(8n^2 + 20l^2 - 16m^2) + (8n^2 + 8l^2 - 4m^2)(8l^2 + 20m^2 - 16n^2)$$
$$+ (8l^2 + 8m^2 - 4n^2)(8m^2 + 20n^2 - 16l^2)]$$

$$= \frac{1}{16.81}[(-128 - 80 + 64)m^4 + (64 - 128 - 80)n^4 + (-80 + 64 - 128)l^4$$
$$+ (64 - 128 + 160 + 64 + 160 - 32)m^2n^2$$
$$+ (160 - 32 + 64 - 128 + 160 + 64)n^2l^2$$
$$+ (160 + 64 + 160 - 32 + 64 - 128)l^2m^2]$$

$$= \frac{1}{16.81}[288(l^2m^2 + m^2n^2 + n^2l^2) - 144(l^4 + m^4 + n^4)]$$

$$= \tfrac{1}{9}[2(l^2m^2 + m^2n^2 + n^2l^2) - (l^4 + m^4 + n^4)]$$

$$= \tfrac{1}{9}[(l + m + n)(m + n - l)(n + l - m)(l + m - n)$$

$$\therefore\ \text{Area} = \tfrac{1}{3}\sqrt{(l + m + n)(m + n - l)(n + l - m)(l + m - n)}.$$

NOTE.—Each term might have been divided by four before multiplication.

2. RALPHO.—Prove that

$$\frac{\sin(\alpha + \beta)}{\sin\alpha + \sin\beta} = \frac{\cos\frac{\alpha + \beta}{2}}{\cos\frac{\alpha - \beta}{2}}.$$

$$\frac{\sin(\alpha + \beta)}{\sin\alpha + \sin\beta}$$

$$= \frac{2\sin\frac{\alpha + \beta}{2}\cos\frac{\alpha + \beta}{2}}{2\sin\frac{\alpha + \beta}{2}\cos\frac{\alpha - \beta}{2}}$$

$$= \frac{\cos\frac{\alpha + \beta}{2}}{\cos\frac{\alpha - \beta}{2}}.$$

Arithmetic.

1. EXNING.—A, B, C, having a joint capital of £10,000, buy with ·93 of it a ship and her cargo, the latter being worth two-thirds of the former. The ship is lost, the cargo saved; what amount per cent. on his whole capital does each partner lose?

$$\text{Value of ship} = \frac{3}{3 + 2}\text{ of }\tfrac{31}{33}\text{ of amount}$$

$$= \tfrac{3}{5}\text{ of }\tfrac{31}{33}\text{ of amount}$$

$$= \tfrac{31}{55}\text{ of amount};$$

$$\therefore\ \text{Loss by each partner} = (\tfrac{31}{55} \times 100)\text{ per cent.}$$

$$= \tfrac{620}{11}\text{ per cent.}$$

$$= \underline{56\tfrac{4}{11}\text{ per cent.}}\ \text{Ans.}$$

2. PUZZLED.—A person, who has £10,257 10s. 3 per cent. stock, calculates that by selling it and investing in $3\frac{1}{4}$ per cent. stock at $93\frac{1}{4}$, he can increase his annual income by £10 9s.; but, before he can effect the exchange, each stock rises $\frac{1}{4}$ per cent. By how much is his income really increased?

(*Capel's* 'Catch Questions in Arithmetic and Mensuration.')

Income in first case = 3% on £10,257 10s.
= £102 11s. 6d. × 3
= £307 14s. 6d.;

Income in second case before rise in stocks
= £307 14s. 6d. + £10 9s.
= £318 3s. 6d.;

Amount of stock in second case
= £318 3s. 6d. × $\frac{100}{3\frac{1}{4}}$
= £318 3s. 6d. × $\frac{400}{13}$
= £24 9s. 6d. × 400
= £9,790;

∴ Original price of first stock

$$= \pounds 93\tfrac{1}{4} \times \frac{9790}{10257\frac{1}{2}}$$

$$= \left(\frac{\cancel{373}}{\cancel{4}} \times \frac{\overset{89}{\overset{\cancel{4895}}{\cancel{19580}}}}{\underset{55}{\cancel{20515}}}\right)\pounds$$

= £89.

$$\left.\begin{array}{ccc} \pounds & & \pounds \\ 93\frac{1}{4} & : & 89\frac{1}{4} \\ 100 & : & 3\frac{1}{4} \end{array}\right\} :: \pounds 10,257\tfrac{1}{2} \;:\; \text{Income in second case}$$

$$= \left(\frac{\overset{21}{\cancel{357}} \times 13 \times \overset{373}{\overset{\cancel{1865}}{\cancel{20515}}}}{\underset{\underset{2}{\cancel{34}}}{\cancel{374}} \times \underset{80}{\cancel{400}} \times 2}\right)\pounds$$

$$= \frac{101829}{320}\pounds$$

= £318 4s. $3\frac{3}{4}$d.

∴ Increase in income = £318 4s. $3\frac{3}{4}$d. − £307 14s. 6d.
= £10 9s. $9\frac{3}{4}$d. Ans.

3. ROMULUS.—During the first half of the present financial year the income tax was fixed at 5d. in the £. But during the second half it was increased to 8d. in the £. A gentleman, whose income was at the rate of £1,000 a year more in the second than in the first half-year, finds that he pays for the year £35 8s. 4d. more income tax than he would have paid, if his income and the income tax had remained unchanged. Find income and income tax.

(*Capel's* 'Catch Questions in Arithmetic and Mensuration.')

$$\begin{array}{l} \qquad\qquad\qquad\quad \pounds\ \ \text{s.}\ \ \text{d.} \qquad \pounds \\ (8 - 5)\text{d. or 3d.} : 35\ \ 8\ \ 4 :: 1 : \text{Income in second half-year} \\ \qquad\qquad\qquad\quad \underline{\ \ \ 20} \\ \qquad\qquad\qquad\quad\ 708 \\ \qquad\qquad\qquad\quad \underline{\ \ \ \ 12} \\ \qquad\qquad\quad\ \ 3\,\underline{|\ 8500} \\ \qquad\qquad\qquad\ \pounds 2,833\ \ 6\text{s.}\ \ 8\text{d.} \end{array}$$

∴ Income = £2,833 6s. 8d. × 2 − £1,000 ÷ 2
= £5,166 13s. 4d. Ans.

Income tax = ($2,333\frac{1}{3}$ × 5 + $2,833\frac{1}{3}$ × 8)d.
= ($11,666\frac{2}{3}$ + $22,666\frac{2}{3}$)d.
= $34,333\frac{1}{3}$d.
= 2,861s. $1\frac{1}{3}$d.
= £143 1s. $1\frac{1}{3}$d. Ans.

4. TRAWTHORN.—A ship has five masts; the height of one is 72 ft., of two others 63 ft., of the fourth 42 ft.; what is the height of the fifth mast, if the average height of the five is 58 ft.?

Height of fifth mast = 58 ft. × 5 − (72 ft. + 63 ft. × 2 + 42 ft.)
= 290 ft. − 240 ft.
= 50 ft. Ans.

Algebra.

1. CYCLOPS.—Two trains start at the same time, the one from London to Norwich, the other from Norwich to London. If they arrive in Norwich and London respectively 1 hour and 4 hours after they pass each other, show that one travels twice as fast as the other. (*Hamblin Smith.*)

Let x = distance in miles between London and Norwich,

And let a and b = Rates in miles per hour of the two trains;

Then distance from London when they meet = $\frac{x}{a+b} \times a$,

And distance from Norwich = $\frac{x}{a+b} \times b$;

$$\therefore \left.\begin{array}{r} \dfrac{bx}{a+b} \div a = 1 \\ \dfrac{ax}{a+b} \div b = 4 \end{array}\right\}$$

$$\frac{4bx}{a\,(a+b)} = \frac{ax}{b\,(a+b)}$$

$$\frac{4b}{a} = \frac{a}{b}$$

$$4b^2 = a^2$$

$$\therefore \underline{a = 2b.}$$

∴ Train from London travels twice as fast as the train from Norwich.

2. ROVER.—If r is positive and

$$(1 + r + r^2 + r^3 + \ldots \text{ to infinity})$$
$$\times\, (1 + p + p^2 + p^3 + \ldots \text{ to infinity})$$
$$= (1 + rp + r^2p^2 + r^3p^3 + \ldots),$$

prove that p must be negative, and that r must be less than $\frac{1}{2}$.

We must assume that r and p are proper fractions.

$$\therefore\ 1 + r + r^2 + \ldots \text{ to infinity} = \frac{1}{1 - r},$$

$$1 + p + p^2 + \ldots \text{ to infinity} = \frac{1}{1 - p},$$

$$\text{and } 1 + rp + r^2p^2 + \ldots \text{ to infinity} = \frac{1}{1 - rp};$$

$$\therefore \frac{1}{1 - r} \times \frac{1}{1 - p} = \frac{1}{1 - rp}$$

$$1 - r - p + rp = 1 - rp$$

$$2rp - p = r$$

$$\therefore \underline{p = \frac{r}{2r - 1}}.$$

Sum of all the terms in the product of $(1 + r + r^2 + \ldots)$ $(1 + p + p^2 + \ldots)$ except $(1 + rp + r^2p^2 + \ldots) = 0$; but all the terms containing even powers of r and p are positive, therefore sums of the terms containing odd powers of r and p are negative; but since r is positive, therefore p must be negative.

Now since p is negative,

$$\therefore \frac{r}{2r - 1} \text{ is negative;}$$

but r is positive,

$$\therefore\ 2r - 1 \text{ is negative}$$

$$\text{or } 2r - 1 < 0$$

$$2r < 1$$

$$\therefore \underline{r < \tfrac{1}{2}}.$$

My Drawing Examination.

BY A

HEAD MASTER OF A LONDON BOARD SCHOOL.

THE Examinations are conducted by an Inspector appointed by the Science and Art Department, who usually requires complete information before the day of his visit. It is a good idea to make a rough plan of the building, with the accommodation of each room clearly marked, and to enclose it with the paper requiring the 'approximate numbers' for examination. He will then be able to arrange his plan of campaign before reaching the school. If the situation of each Standard in the school is shown on the plan, his work will be still more simplified. Of course the Schedule of names (and a duplicate copy) will be ready for him, so that he can check the numbers, as well as enquire about the 'exceptions.'

As this Inspector has to make a report on the methods of teaching, as well as the supply of apparatus, it is a wise plan to keep him in a good temper. To do this the Teacher will be careful to have everything that will be required on the Examination day properly prepared, carefully examined, and placed where it can be *obtained at once* when required. This should be done on the day immediately preceding the Inspector's visit. On the morning of the examination each child must be supplied with paper (Standard I. a slate each), pencil, rubber, ruler, and set squares. In classes where Geometry is done *every* child should be provided with a pair of compasses, while in Standard IV. every child should have a sheet of 'squared' paper as well as a plain sheet. There will then be no need for giving out anything when the Inspector has commenced his part of the year's work.

On the top of each paper should be found :—

1. Child's Name in full.
2. Standard in which examined in Drawing.
3. Age.
4. Name of School. (If there is a 'school stamp' the name should be stamped with it.)
5. Subject. (Model, Geometry, etc.)

A large number of Examinations have been held in various parts of the country, but up to the present time the methods of the Inspectors have varied little. Probable as time goes on they will become more accustomed to the work, and by that time the Teachers will know exactly what to expect from them. A few specimens of the work recently required in each Standard will now be given.

STANDARD I.

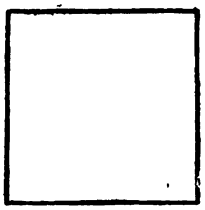
The Inspector usually questions this Standard and Standard II. to ascertain if they have been taught the technical terms used by draughtsmen. He places a figure on the Blackboard and asks for its name. If he sees enough hands up, and gets satisfactory answers to simpler questions, he naturally proceeds to harder ones. The result of this examination is reported as Excellent, Good, Fair, or Indifferent.

The following figures have been drawn on the Blackboard and questioned upon :—

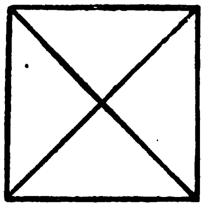
1. A straight line.
2. A crooked line.
3. A curved line.
4. A wavy line.
5. A vertical line.
6. A horizontal line.
7. An oblique line.
8. Parallel lines (*a*) vertical, (*b*) horizontal, and (*c*) oblique.
9. An angle.
10. A right angle.
11. An obtuse angle.
12. An acute angle.
13. A square—the diagonals added after.
14. An oblong, rectangle, or parallelogram (the 3 names required)—one diagonal added.
15. A triangle.
16. An equilateral triangle (term *base* wanted).
17. An acute-angled triangle.
18. A right-angled triangle.
19. A circle.
20. A hexagon.

After this a few questions will probably be asked about the *ruler*, and children will be called upon to show 1 inch, 2 inches, 6 inches, ½ inch, ¾ inch, ¼ inch, &c., upon it.

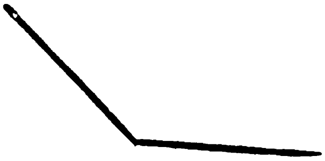
Various methods have been employed for testing the 'ruler' drawing, and the drawing 'without rulers.' In some instances the slates have had a line ruled across the centre, thus dividing it into two equal parts, and the 'ruler' drawing has been done in one half and the 'freehand' drawing in the other. The more general method is to divide the class into two parts, and to set half to draw with rulers and half to draw without them. The children should then write 'Rulers' and 'No Rulers' respectively on their slates. These slates are examined in the school.



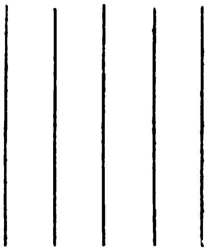
Examination A.—The teacher drew this figure on the blackboard, and the children copied it line by line. The sides were 4 inches in length. Time allowed, 15 minutes.



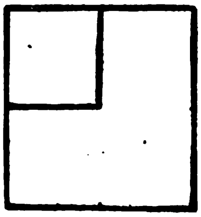
Examination B.—The teacher was told to place this cross on the blackboard (his method is shown), after which half the class copied it with rulers (with sides of 5 inches), and half copied it without rulers, as large as their papers would hold. (The children were questioned about the angles.)



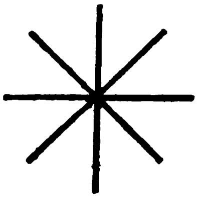
Examination C.—This was drawn on the blackboard by the teacher, and the children with rulers copied it, making lines 4 inches in length; while those without rulers made it as large as their papers would allow.



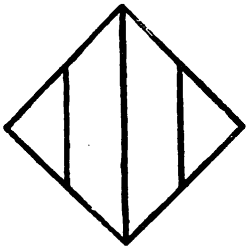
Examination D.—The same method was followed with these lines, each of which was 5 inches in length, and the space between any two was 1 inch in breadth.



Examination E.—The same method was followed. The sides of the larger square were 4 inches in length, and of the smaller one 2 inches. The diagonal should be drawn as a guide line.

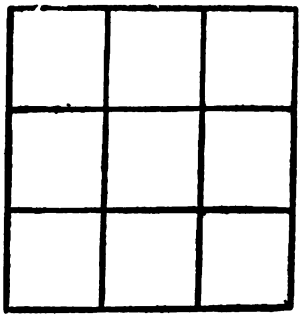


Examination F.—The class was divided into two parts. For half the teacher drew the 'star,' the children copying line by line. This section had no rulers.

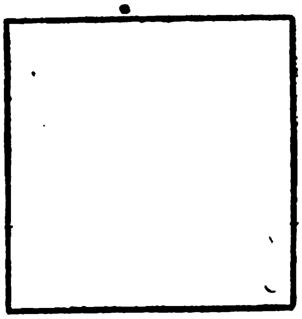


The other half copied, line by line, the square standing on an angle. This section used rulers.

Time allowed, 20 minutes.



Examination G.—This class was also divided into two parts. The square, divided into nine equal squares, was drawn by the aid of rulers.



The section of the class drawing the square only used no rulers.

Time allowed, 20 minutes.

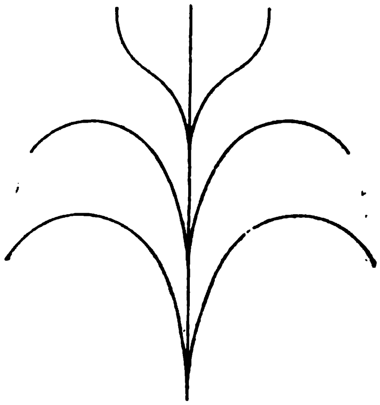
N.B.—It will be seen that nearly all the figures are exactly like those given in the official syllabus.

Standard II.

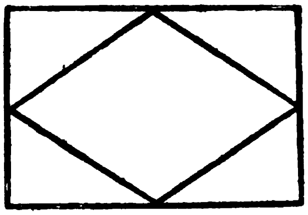
In each of the schools of which the examination is being given, the same copy was drawn by the children in Standard II. as that given for Standard I. The *questioning* was very searching. All the paper work is sent to South Kensington for examination.

Standard III.

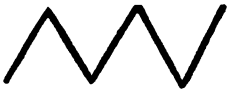
As there are three branches of work in this Standard, the class is usually divided into three sections, one of which does Freehand, another Geometric Drawing with rulers, and the third Geometric Drawing without rulers. The sections are generally equal in size, and the selection of the work to be done is made by the Inspector, thus requiring each child to be prepared fully in every branch of the work.



Examination A.—The Freehand copy was on a sheet of paper rather larger than a foolscap page, which was placed in front of the class. The lines were thick enough to be seen by a child with good eyesight; but if there were any 'short sighted' or 'weak sighted' children, the Inspector would probably supply each with a small copy if the teacher drew his attention to them.



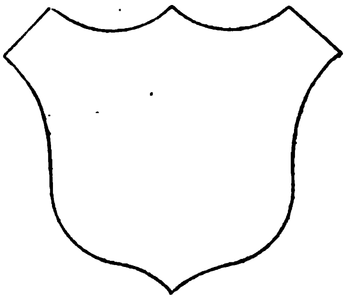
This figure was drawn on the blackboard by the teacher, and copied by the children, who used rulers. The long sides of the oblong were each 7 inches long, and 5 inches was the length of each of the shorter sides.



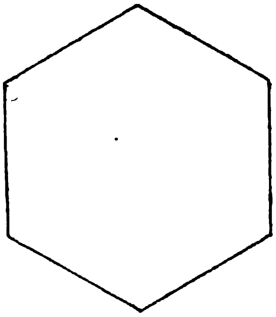
The third section copied this figure from the blackboard. The only instruction given was to make it as large as the paper would allow. No rulers were allowed.

Examination B.—This examination was conducted in exactly the same manner as the last mentioned. The three copies given were:—

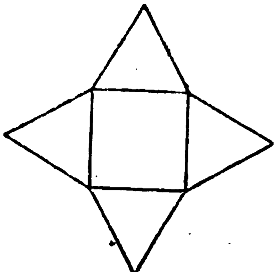
(*a.*) Freehand.

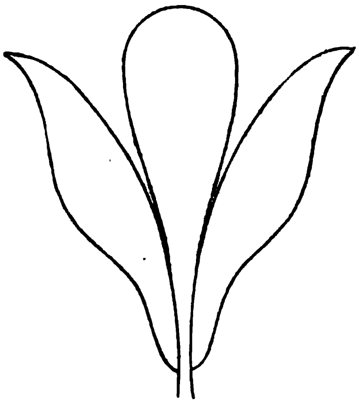


(*b.*) Rulers.

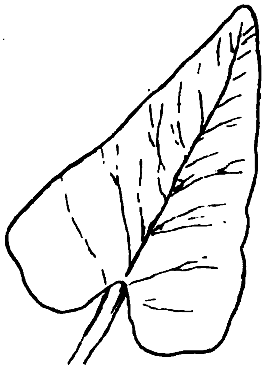


(*c.*) No Rulers.

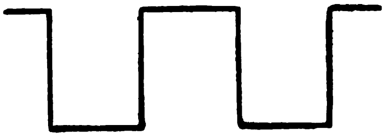


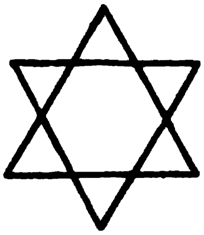


Examination C.—Each child in this section was given a card with this figure upon it, and was told to copy the figure, enlarging it to the size of the paper. Time 30 minutes.



A second copy was placed on the blackboard, in front of the class, and the second section was told to make a drawing like it as large as the paper would allow. Time 30 minutes.

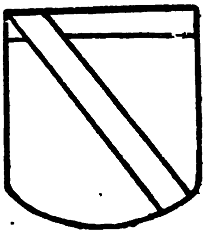




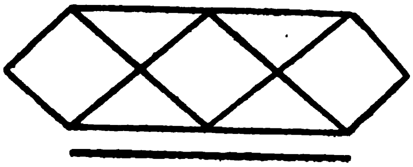
Every child in the third section was given a card with these two figures upon it, and was told to copy them, using rulers. Time 30 minutes.

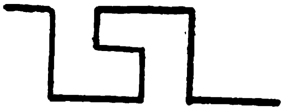
Examination D.—The class was divided into two sections. Each child was supplied with a card on which was a copy. The time allowed was 40 minutes.

(*a.*) Freehand copy.

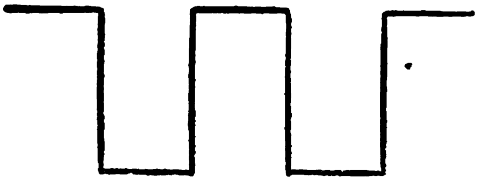


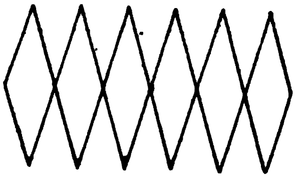
(*b.*) Copies to be drawn with rulers.



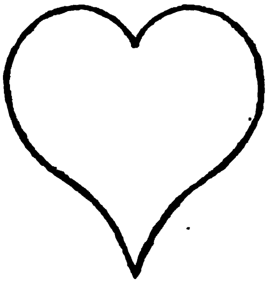


Examination E.—The class was divided as in the last examination, but the freehand copy was on a large sheet in front of the class. The copy was like the one given in *Examination B.* In the geometry section each child had a card on which were the two following copies, to be drawn with rulers:—

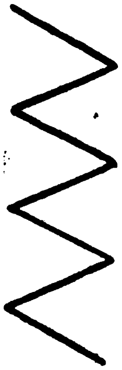




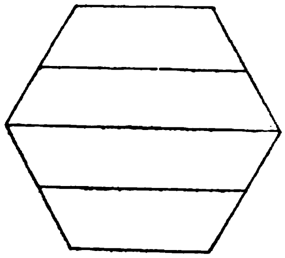
Examination F.—This class was divided into three sections.



Each child in the first section was given a card and told to copy the figure upon it on the drawing paper, taking care to enlarge it. Time 30 minutes.

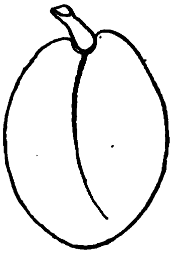


This figure was drawn on the blackboard by the teacher, and copied by the children, who did not use rulers. Time 30 minutes.

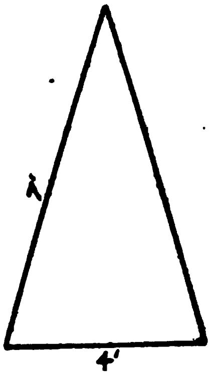


Each child in the third section copied the given figure from the blackboard, using rulers. Time 30 minutes.

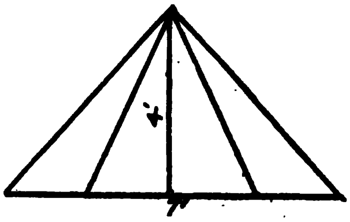
Examination G.—This class was divided into five sections.



The children in the first section copied the given figure from a large sheet of paper placed in front of the class.



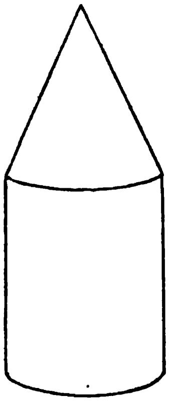
This figure was drawn upon the blackboard by the teacher, when the second section copied it, using rulers, and the third section copied it, not using rulers.



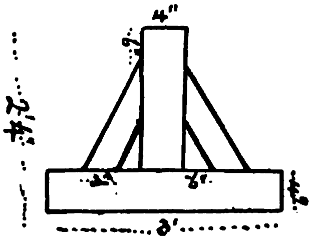
The teacher drew this figure upon the blackboard, and the children in the fourth section copied it, using rulers, while those in the fifth section copied it, without using rulers.

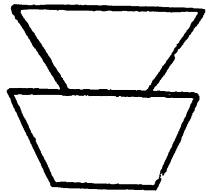
STANDARD IV.

Standard IV. is generally divided into four sections, the front row (or rows) of children taking model, and the others freehand and drawing to scale (*a*) with and (*b*) without squared paper. They are arranged to prevent copying in almost every instance.

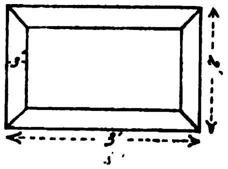


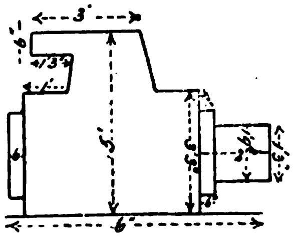
Examination A.—The cone standing upon a cylinder was given for model, the children being told to make a *large* drawing. Time, 40 minutes.





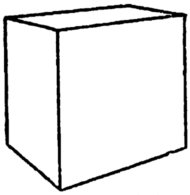
For scale drawing the two copies to be drawn on plain paper were upon a card. The first was to be drawn to a scale of 1" to 1', while the second was to be copied twice the given size. Time, 40 minutes.



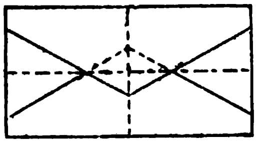


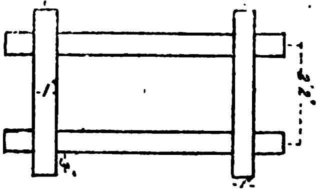
Each child in the section which used squared paper was supplied with a card, on which were two copies, the first to be drawn to a scale of 1" to 1', and the second to a scale of ½" to 1'. Time, 40 minutes.

For the fourth section a large copy was placed in front of the class, and each child was required to make a drawing which would fill the paper he was using. Time, 40 minutes.



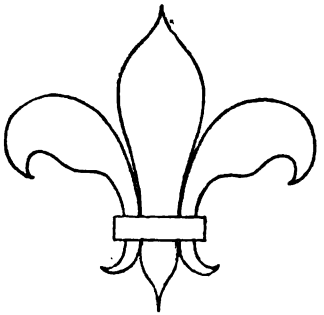
Examination B.—The model given was a cube. and the children were told not to draw small figures, Time, 40 minutes.



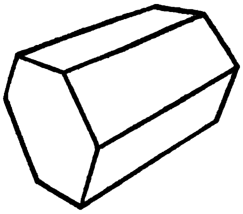


Each child drawing on plain paper for scale drawing was given a card on which there were two figures, the first to be copied three times the given size, and the second to a scale of 1" to 1'1". Time, 40 minutes.

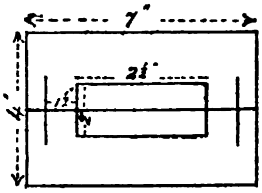
The card given to those who used squared paper was like that given in *Examination A.* Time, 40 minutes.

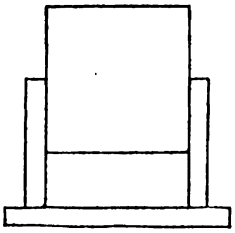


The freehand copy was placed before the class, with instructions to make a large copy. (In this instance the copy was placed to the right of the class, which made it very difficult for those on the left, on account of *foreshortening*.)

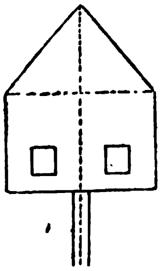


Examination C.—The model given was the hexagonal prism. Although this is not a rectangular solid it is frequently set for examination. Time 40 minutes.

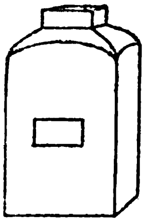




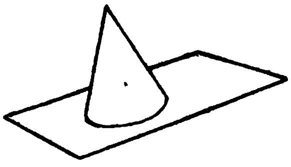
Each child drawing to scale on plain paper was given a card on which were two figures, the first to be drawn to a scale of ¼" to 1", and the second to be copied twice the given size. Time 40 minutes.



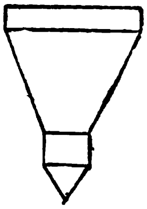
The card given to each of those who used square paper had a figure to be copied and this question:—'Draw a scale of half an inch to the foot, showing 3′ 6″.' Time 40 minutes.

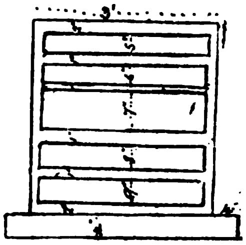


The freehand copy was placed in front of the class, being on a large sheet of paper. Time 40 minutes.

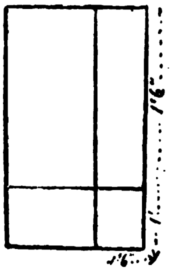


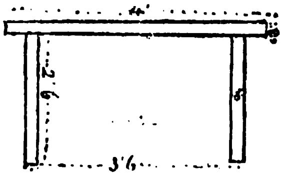
Examination D.—In the model drawing section the children were given a blackboard with a cone standing upright. The blackboard was to be drawn, and this proved the chief difficulty in the examination.



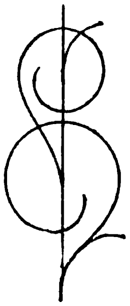


A card was given to each child in the section that did drawing to scale on plain paper. There were two figures to be drawn, the first was to be copied twice the given size, and the second to a scale of 1′ to the foot.

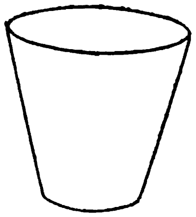




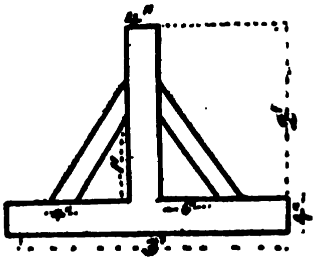
The difficulty experienced by the children in the other section was to make the figures appear correct, as the lines were out of proportion in the copy. The first figure was to be copied, allowing each side of a square to represent one inch, and the second was to be copied, allowing each side of a square to represent two inches.

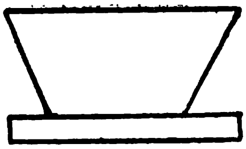


Each child was given a card in the section that did freehand.



Examination E.—A flower-pot was placed on the floor in front of the class, and the model section copied it, being instructed to make a *large* drawing.





The Cards contained two figures to be copied by those who used plain paper. The first was to be drawn to a scale of 1" to 1', and the second to be copied twice the given size.

The card given to the section using squared paper was exactly like that given in *Examination D.*

The Freehand copy was similar to that given in *Examination B*, but only 35 minutes were allowed to complete it.

(To be continued.)

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Publications Received.

BLACKIE & SON.—The Century Reader, No. 4; The Century Home Lesson Books, Nos. 1, 2, and 3.

CURWEN & SONS.—Choruses for Equal Voices, Nos. 110 and 112.

DAWSON, A. G.—The Teachers' Drawing Manual (*Bridge*); The Townley Standard Practical Arithmetics. Standards II. and III. (*Beard*); Answers to ditto; Bridge's Demonstration Sheets, Standard IV.

DEAN & SON.—Corner's History of Ireland.

FISHER UNWIN, T.—The Century and St. Nicholas Magazines, January; The Century Magazine Christmas Number.

HEYWOOD, JOHN.—Handbook to the Code Examinations, Standard II.; Science Lectures for the People, Nos. 7 and 9; Maternity (*O. S. Fowler*).

LONGMANS & CO.—Petit Théâtre des Enfants (*Mrs. Hugh Bell*); Memoir of William Ellis; Longmans' Elementary Science Manuals: Building, Construction (*Burrell*); Elementary Mathematics; Epochs of Modern History: The English Restoration and Louis XIV. (*Osmund Airy*); Lessons in Elementary Mechanics (*Grieve*).

MACMILLAN & CO.—Progressive French Reader, Part 2 (*Eugène-Fasnacht*).

MARCUS WARD & CO.—Garry's Elocutionist.

MURBY, T.—Music—'Excellent:' The Grind-e-Lay of a First Class C.M. (*T. Murby*).

NELSON, T., & SONS.—'Royal' Object Lesson Series, Sheet No. 1; Reader; Notes of Lessons. The Principles of Agriculture, Third Stage (*Jerome Harrison*).

PARTRIDGE, S. W., & CO.—Prizes: More Precious than Gold (*Jeannie Chappell*); The King's Daughter (*Pansy*); Robert Aske (*E. F. Pollard*); Vashti Savage (*Sarah Tytler*); Jack the Conqueror (*Mrs. Bowen*); 'A 1' for December.

PHILIP & SON.—The Educational Annual for 1889.

SMITH, ELDER & CO.—The Cornhill Magazine, December and January.

SWAN SONNENSCHEIN & CO.—Parallel Grammar Series: Latin, Part I.; French, Part I.; English, Part II.; German, Part I.

THIN, JAMES.—Workshop Notes and Sketches in Woodworking. (*T. A. Clark*).

WILLIAMS & NORGATE.—Kaiser Wilhelm I. (*Rühle*).

Publications Reviewed.

GIFT BOOKS OF THE SEASON.

S. W. Partridge's List.

(1) Nashti Savage. By Sarah Tytler.

The story of a runaway gipsy girl, picked up by a kindly, good-tempered, easy-going gentleman on a dark night, and taken first to one house on his estate, then to the poorhouse, to others, and lastly into his own house. Girls—and boys, too—will become thoroughly interested in the wild, untutored creature, who never completely loses the traces of her gipsy nature, but gradually becomes the servant and friend of the inmates of the house into which she has been introduced, and lastly the saviour of the life, if not of the honour, of him who had rescued her. A simple, natural story, gracefully told, and calculated to leave none but good impressions on the mind of the reader.

(2) Robert Aske: A Story of the Reformation.
By Eliza F. Pollard.

The character whose name gives the title to the story is perhaps not the one in which the reader will be most interested in this beautiful volume. William Tyndale, the translator of the Bible, with his earnest desire to finish his work; his friends, Christopher Aske, the cripple Lisbeth, and the dwarf Triboulet, all take a great part in contributing to the interest of the story. But the reader will be attracted by the manly, straight-forward conduct of Aske himself, who became one of the chief leaders in the Pilgrimage of Grace in Henry's reign, and finally paid the penalty of his life through the machinations of Reginald de la Pole, whose plots for the destruction of Tyndale and the restoration of the Catholic Church in England form a great part of the story. It is a book with a purpose, and that purpose well served.

(3) Jack the Conqueror. By Mrs. C. E. Bowen.

Just the book that will do good to struggling lads anxious to do well, in the midst of unpropitious circumstances. Jack was an orphan living with a crabbed aunt, who neither clothed, fed, nor educated him properly. A chance meeting with an artist puts new thoughts into his head, and his efforts to become clean, respectable, and educated, are vividly described. His success in gaining a scholarship opens out for him a career, and the ragged, unkempt youth eventually becomes the loved and trusted tutor in a college, eagerly helping all who, like himself, had a great deal to do in the early struggle for existence. 'Resolve well and persevere' will, we are sure, become the motto of many a reader of this bright little story.

(4) The King's Daughter. By Pansy.

Dell Brouson, the heroine of this temperance story, was no earthly king's daughter, but the only child of a saloon keeper in one of the States. She had been brought up at her uncle's, but at eighteen her father sent for her to keep his house. The change was hard to bear, but she had learned to think of another than an earthly home, and she cheered herself by remembering the 'many mansions' and of being a 'King's Daughter.' Then the authoress tells of Dell's practical Christianity, of her efforts to reform the village, of her influence with the vilest and worst characters in the place; she tells of her trials and triumphs, her failures and her successes. This is done in no goody-goody style, but with a naturalness and cheeriness which extract sympathy with her heroine, and a desire for her final triumph in her self-imposed task. Many a young girl should feel tempted to follow her good example and become sharer of her satisfaction and crown of rejoicing.

More Precious than Gold. By Jennie Chappell.

This is a love story. Ivy Leaf, brought up by two garrulous maiden ladies, is engaged to a good, rich young man called Atherton, but she prefers a wandering artist called Druce and runs away with him when she finds out that Atherton is intending to give up his fortune to the rightful heir if he can be found. Of course the good young man remains constant to his worthless fair one and by and bye finds her out deserted by her husband and in want. At the same time by some wonderful process told in an indifferent way it turns out that Ivy Leaf is the heir to the property he has given up. The worthless husband appears on the scene, drinks and gambles the fortune away, and almost kills himself in an attempt to shoot his rival, whom he hates. The good young man nurses him till he dies and then marries his widow. It is a vapid story, and is not mended in the telling by the extravagant use of adjectives generally of the superlative kind.

Earth Knowledge (*Part II.*): a Text Book of Advanced Physiography. By W. Jerome Harrison, F.G.S., and H. Rowland Wakefield. London: Blackie & Son.

This volume, like its predecessor (Part I.), is the work of two demonstrators engaged in the teaching of science under the Birmingham School Board. The geological portions of the book, and those introducing the laws of physics, are well done. The difficulties attending a simple form of explanation of astronomical phenomena are manifest, and we think they would have been more satisfactorily overcome had the writers introduced more plentifully the power of diagrammatic illustration which they know so well how to use. The omission of any reference to the '*Equation of Time*' in the account of terrestrial longitude is serious, in view of last year's questions in physiography. There should also be a fuller explanation of the reason of the moon's influence in producing a tide being greater than that of the sun. Science teachers who require a concise statement of the main truths of the advanced course in physiography for purposes of revision will do well to examine this volume for themselves.

Historical and Commercial Geography, and Atlas. By Dr. Dick. London: Thomas Murby.

This excellent work is a complete elementary geography for schools; it is a new and enlarged edition, with its facts corrected to the present date, and beautifully illustrated by twenty-four engraved and coloured maps. The association of the facts of political and historical geography is a very valuable feature in this work, as is also the connection everywhere struck between the physical and commercial geography of each district. When we consider the amount of matter here presented, its excellent arrangement, and the splendid maps which fully illustrate the text, we are compelled to admit that no better geography at the price is available for the student of elementary geography.

Elementary School Atlas. By J. Bartholomew, F.R.G.S. London: Macmillan & Co.

This Atlas presents several novel features of value to the youthful student of geography. The Hemispheres, drawn from six different points of view, is a capital idea, and will do much to give a correct notion at first of the world as projected on a flat surface. Map 3 is another very valuable feature; here we have two bird's-eye views of typical geographical facts, and accompanying each picture is a map, thus showing clearly the distinction between a picture and a map. The main truths of Physiography and Physical Geography are admirably illustrated, as are also the principal facts of descriptive, political, and commercial geography. Everything likely to be introduced into an ordinary course of school geography is well illustrated, and at the same time presented in a most attractive style.

Garry's Elocutionist. London: Marcus Ward & Co., Farringdon Street.

Mr. Garry has produced an admirable and varied collection of pieces suitable for recitation or reading on the platform or in the drawing-room. Some are old favourites, but many are new, copyright, and unhackneyed. The book is a welcome addition to those we have hitherto had compiled for the same purpose. Mirth-provoking and sympathy-rousing pieces are judiciously blended, and if the directions given in the sixteen-page introduction are followed by the reciter, much pleasure will be afforded to the audience privileged to hear the pieces declaimed.

Standard Teaching Helps. Part V. By H. Major, B.A., B.Sc. London: A. G. Dawson, Ivy Lane.

Mr. Major is a prolific writer, but what he does he usually does well, and this book is no exception to the rule. There is no part of the work required by the Second Standard in any subject omitted, and the best method of teaching the subject known to a practical teacher of Mr. Major's experience has been incorporated. Where the class teacher wishes to produce good results by intelligent teaching, and especially where the head teacher is so much engaged as to be unable to give constant help and supervision, the book will prove of decidedly good service. Young teachers, and teachers who have had little or no training, cannot have a better guide.

Livy. Book XXII. By L. D. Dowding, M.A. Deighton Bell and Co.

Livy. Book XXII. By M. T. Tatham, M.A. Clarendon Press.

Of these two editions the former is professedly intended for the use of 'advanced students, especially at the universities,' and therefore deals with questions of text which Mr. Tatham, editing for schoolboys, rightly leaves untouched. Both are parts of larger works, Mr. Dowding having already published an edition of Book XXI., and Mr. Tatham's book being simply a section of his larger volume containing Books XXI.—XXIII., the only important difference being the insertion of two useful maps for the Trasimene Lake and Cannæ. It is to be regretted that Mr. Dowding did not adopt the same expedient. His note on the vexed question of the site of the battle is very inadequate. It is curious to observe that the two editors from premisses almost verbally identical draw exactly opposite conclusions. Mr. Dowding says (ch. 45, s. 6), 'as the Romans faced south, and had their right on the river, it seems evident that the battle took place on the left or north bank.' Mr. Tatham on ch. 43, s. 11, says, 'as the Romans faced south, with their right nearest the river, and the river runs N.W., it is clear that the battle must have been fought on the right (S.E.) side of the river.' The annotation in Mr. Tatham's book is generally clearly put, and sufficient for the objects it seeks. We doubt the correctness of his explanation of the *moratus* in the first chapter. It is tolerably clear that the reference is to a possible further stay amongst the Cisalpine Gauls, where Hannibal had wintered. It was dangerous to remain there longer, for the reasons which Livy goes on to detail in the following sections. If so, the reference to the passage in Book XXI. is not to the point. In his note on ch. 42, s. 1, the editor repeats the undoubted error of his earlier edition. The *stationes* were, as Mr. Dowding points out, the *Carthaginian* pickets, and *subductæ* has its common sense of 'withdrawn.' The two circumstances which surprised the Romans were the withdrawal of Hannibal's pickets, and the silence in his camp. Nor in ch. 59, s. 10, is there any advantage gained by translating *ne illi quidem—se prætulerint*, '*let* not those, *&c.*' It gives as good sense to translate '*not even* those, *&c.*:' the use of the completed for the simple future is natural, and the *merito* which, as the editor has seen, is rendered superfluous by his construction, takes its right place in the sentence. In Mr. Dowding's edition, whilst recognising much industry and ingenuity, it is impossible to express complete satisfaction with the results of his critical labours. Neither his emendations nor his defence of the MSS. readings as a rule carry conviction with them. In ch. 1, s. 16, he keeps *præfarentur* and rejects the usual emendation of *profarentur;* but the passage in Bk. V., ch. 43, which he quotes in support, tells rather against than for his contention. His conjecture of *inter fortunæ minas et saxa*, in ch. 16, s. 4, can hardly be held satisfactory. In ch. 3, s. 6, it is easier to see an instance of Livy's carelessness about geographical accuracy than to accept the emendation of *praeterieus* for the MS. *petens*. The defence given of the reading *dictatorem* in ch. 8, s. 6, is not very strong : at any rate the argument on the other side is overwhelming. Are we to believe that Livy wrote '*because* the people had no power to create a dictator, as they never had done till now, the people created Fabius dictator?' There is, by the bye, a misprint of *praetor* for *prodictator* at the end of this note. In explanation of Hannibal's odd exclamation at the battle of Cannæ, *quam mallem vinctos mihi traderet*, it may be suggested that his meaning was 'He might as well have put them into my hands bound hand and foot, and spared me the trouble of fighting.' Livy was much more likely to put such a contemptuous phrase into Hannibal's mouth than give him the credit of a humane desire to avoid unnecessary bloodshed. It is a strange oversight to have allowed the insertion of a map of Italy to illustrate Book XXII., which does not extend far enough to the north to include the Trasimene lake; and for the sake of economy of space, it would have done no harm to omit such notes as that on the origin of the name *Gabii*, 'said to be abbreviated from Galatus and Bius, the reputed founders,' and the record of the editor's journey from Rome to Tibur by steam-tram, and his admiration for the *Cascastelle* (*sic*) at that place.

Ajax of Sophocles. Edited by F. A. Paley, LL.D. Cambridge Text Series. Deighton Bell & Co.

By the cheap, and in most respects admirable, editions of single plays of the Greek tragic poet which Dr. Paley has done for this series, he has rendered a very acceptable service to teachers and learners in our schools; his work has materially enlarged the range of selection for school reading; the master can, with confidence, put into the hands of his boys editions which have the guarantee of Dr. Paley's high and deserved reputation as a scholar. With regard to the critical exegesis of the text, Dr. Paley's authority will always and justly give great weight to his conclusions. Even where we dissent we feel that they are the deliberate verdict of a learned and able commentator; the annotations do not disclose any traces of haste or carelessness; if they err at all it is rather on the side of over-elaboration for an edition intended chiefly for school use. Perhaps it may be allowable to point to what we cannot help considering a grave defect in Dr. Paley's work, looking at it as an instrument of education: we mean the almost complete absence of any expressed appreciation of the play as a noble example of the art of one of the world's greatest dramatists. For the paragraphs in the preface on the character of Ajax, Odysseus, and Tecmessa are not calculated to awake the sympathy and direct the admiration of the young reader to the wonderful picture of the proud heart of Ajax tortured by the sense of a shame which he can neither brook nor repudiate. Nay, we think our complaint might be extended, and that the commentary frequently obscures the brilliancy and enfeebles the force of the original to a quite unnecessary degree, and especially by the inadequacy, the prosaic *banalitè* of its versions. When Teucer's messenger reaches the tent of Ajax only to find him gone, and the last hope of saving him vanished, what could more surely destroy in a boy's mind any sense of the tragic intensity of the occasion than to render the messenger's cry *'Ιοῦ, ἰοῦ | βραδεῖαν ἡμᾶς ἆε' ὁ τήνδε τὴν ὁδὸν | πέμπων ἔπεμψεν* by 'Dear, dear! Gone out? Then it is too late,' &c. A like note of incongruity is struck at the outset of the play, where *μετρόυμενον ἴχνη τὰ κείνου* is explained, 'comparing with his (big) feet the size of the marks'! Such lapses as these strike one as a kind of indignity inflicted on the great poet; and it seems to us a chief merit of the younger generation of Cambridge scholars that they have felt and sought to illustrate the classics as splendid literary achievements as well as subjects for philological criticism. Take Professor Jebbs' Sophocles, not yet completed, and Mr. Sandy's edition of the Bacchæ of Euripides, as examples.

Suggestive Lessons in Practical Life. Smith Elder and Co.

We noticed these books upon their first appearance, and we pointed out how useful, suggestive, and attractive they were. To a large extent they are original in the way of reading books: they were not designed for any special standard or code. They were intended to arouse interest in all that is of most importance to us, and as far as possible to satisfy it; to inspire, as the author tells us, an intelligent zeal in the pursuit of useful information; to make the art of reading itself a pleasure;
from the new fields of thought. It opens the useful inquiry. We are not surprised to see a new edition; we hope to see many more. Boys are sure to like it, and when they begin it they are sure to read it through.

The Townley Standard Practical Arithmetic. Standards II. and III. By William S. Beard. London: A. G. Dawson, Ivy Lane.

Suitable, well-arranged little books of graduated examples, both mechanical and problematical, for the two standards named. The answers are correct, and well printed on separate sheets.

Physiography. (Elementary Course.) By Andrew Findlater, M.A. New Edition. London and Edinburgh: W. and R. Chambers.

The appearance of a new edition of this work is very opportune, as the newly arranged syllabus requires additional matter to that which has proved very serviceable in the former editions.

The chapters on the various forces of nature are excellent, the matter being sufficient, clearly stated, and fairly well illustrated. When, however, we come to the chapters dealing with the changes these forces have effected in the structure of the earth's crust the matter becomes somewhat meagre and disappointing. In the **mineral** section, *e.g.*, if we look for *felspar*, all we find is that it 'is usually of a pink or red colour, it is not so hard as the other (silica) and may be scratched but not easily.' We doubt whether so meagre a statement upon this important group of minerals is sufficient for a pass even in the elementary stage. In the chapter on **Rocks** there is no attempt at a complete classification the igneous being dismissed in a page and a half; the terms Granitic, Volcanic and Basic, and Intermediate, do not appear; whilst such individual rocks as Pumice, Basalt, Gabbro, and Obsidian, do not seem to be even named. Occasion has been taken upon the re-issue to add to the chapter on coral formations. The new Theory of Atolls by Dr. John Murray should be known, but the value of the chapter is completely discounted by the introduction of the erroneous and most misleading term, '**coral insect.**' On page 87 it is stated that a submerged forest is found 'on the coast near Lincoln;' this should be at Mablethorpe on the Lincolnshire coast. Again on page 131, Snow is stated to be 'just ice in a granular condition' instead of in a crystallized condition. The old notion that 'heated air and other gases are ascending above the fire and the colder and heavier air around is pressing in to supply the **vacancy** (?)' is continued and repeated. Again it is found on page 134 under the heading of Sea and Land

Breezes, 'The air above it (the land) ascends and the heavier air from the sea rushes in.' The phrase 'how ice becomes plastic' is unfortunate, for the context shows that ice is not plastic. The last paragraph in the syllabus including **'The movements of the earth and their results'** with no less than nine sub-sections are entirely absent from this new edition and will necessitate the purchase of another book in order that the student may cover the essential portions of the Science and Art Syllabus.

The Century Primers. Nos. 1 and 2.

The Century Infant Reader.

The Century Readers. Nos. 1, 2 and 3.

London: Blackie and Son.

This new series of reading books appears in strong and neatly designed covers of the bright red colour which has recently become the fashion for school books. Thus outwardly attractive, they appear on examination to be no less pleasing and satisfactory in the arrangement and character of the lessons they contain. In the Primers and Infant Reader, the type is clear; the new words are carefully introduced; good use is made of the principle of analogy in classifying words of similar sound and regular spelling; and there is an abundant supply of new and amusing illustrations.

The volumes for the Standards are marked by many excellent features. There is considerable freshness about the matter of the lessons. In many cases the interest is made continuous, by the subject or story being carried on through a series of lessons. Moral teaching of a most desirable kind is given in a most attractive and impressive way, as in the story of 'The Haughty Harvest Mouse' in Book III., and many others. Exercises in Dictation and Grammar are appended to nearly every lesson. At the end of each book we find a course of grammar lessons for the Standard, a selection of pieces suitable for repetition, lists of difficult words for revisal, and a set of note and time tests, both in the Tonic Sol-fa and the Staff Notations.

The University and Civil Service Arithmetical Examiner. By W. S. Beard. London: A. G. Dawson, Ivy Lane.

Mr. Beard has collected a large number of questions given at various examinations, and arranged them in 120 sections, according to the rules of Arithmetic to which they belong, each section containing seven sums. To each question a letter is affixed signifying the examination from which it has been culled, and answers are given to the examples with full solutions to theoretical questions. In an appendix various reference tables, rules, and uncommon formulæ have been placed. It is thus hoped that the book may serve the double purpose of a guide to the examinations and an additional exercise book suitable for revision purposes in higher and secondary schools. The book is well got up, clearly printed, and reasonable in price.

Wall Map of England and Wales. Edinburgh and London: W. and A. K. Johnston.

This is a very effective production, and ought to come into decided favour. Amongst those points which seem somewhat distinctive in this map are the following: the rivers are printed in dark blue, the sea in light blue, the hills in brown, whilst the various counties are separately coloured red, green, yellow, purple, or brown, so that all possibility of confusion is avoided. The population of the various towns is shown by symbols and different types of lettering, and as also the heights of the chief mountains are given, and battlefields, cathedral towns, and county towns indicated, it will be seen that a large amount of information other than that relating to mere place-position is embodied in this map.

Examples for Analysis in Verse and Prose from well-known sources. Selected and arranged by F. Edwards. London: George Bell and Sons.

The teacher desirous of making his lessons in grammatical analysis bright and interesting by the use of suitable and striking examples of good poetry and prose, will find in this little book a valuable store of extracts, carefully graduated and arranged in three sets,—first, simple sentences; second, complex sentences; and third, miscellaneous examples. The passages vary from single lines from classical English compositions, to whole sonnets of Keats, Mrs. Browning, Matthew Arnold, and long passages of Ruskin and Emerson's beautiful prose. It should be noted that the examples are not accompanied by any hints or suggestions on their treatment.

Blackie's School Classics: The Tragedy of Macbeth, by Shakespeare, with Notes. The Tragedy of Hamlet, with Notes. The Tragedy of King Lear, with Notes. London: Blackie and Son.

To their series of School Classics, Messrs. Blackie have recently added neat and handy editions of three of the great tragedies of Shakespeare. The text followed is that of the Globe Shakespeare, and the plays are abridged by such omissions only as are desirable in adapting them to school use. In each book is printed a brief introduction, which includes a readable account of Shakespeare and his poetry, and an outline of the particular play which follows. The notes are printed at the end with reference numbers to the lines. They appear to be of the most serviceable kind, being brief and to the purpose, and free from that needless elaboration which is apt to bewilder the minds of young students. The books will serve as reading books for the highest classes in elementary and other schools, and as text books for pupil teachers and other students.

The Royal Upper Class Readers. Great Authors. First Period—Chaucer to Pope. London: T. Nelson and Sons.

This volume completes an admirable set of three literary reading-books, the two dealing with later periods having been issued earlier and already noticed in these columns. The great authors whose lives are here recorded in simple but impressive manner, and whose works are suitably exemplified, include the loftiest of our poets and the most famous of our prose writers. Chaucer, Spenser, Shakespeare, Milton, Dryden, Pope, are names that stand highest in our roll of poets, and Bacon, Bunyan, Defoe, and Addison fitly accompany them. The young student who is introduced to such master-minds through the medium of this Reader is likely to find the acquaintance so pleasing and interesting that he is likely to take further opportunities of improving and extending it. We most heartily repeat our commendation of this series, which is produced in Messrs. Nelsons' well-known attractive style.

Poynter's South Kensington Drawing Book: Freehand for Children. By E. J. Poynter, R.A. London: Blackie and Son.

If there is a possibility of developing the artistic faculty in children at all, it should be done by means of these graduated examples of common things. The whole of the examples have been chosen from objects children see around them daily; and as there are guides to simplify the work, and full instructions in simple language, the beginner is sure to be interested and encouraged to persevere, and by the time he has mastered the four books he will have no mean idea of beauty of form, correctness of drawing, and ability to execute the admirable models here given.

The Jubilee Series: Reader for Standards V. and VI. London: Bemrose and Sons.

Though the Jubilee Year has passed many of its tokens remain to us. Here we have the final volume of a series of Jubilee Readers. It is distinguished by remarkably bold and clear type, and contains a good selection of lessons. Many of these are old favourite from well-known authors, while others have the novelty that belongs to recent newspaper articles on interesting subjects, such as 'Earthquake Terrors,' occasioned by the shocks in the Riviera, and 'The Bookstalls and Libraries.' Narratives of 'the Coronation of Queen Victoria,' 'the Children's Jubilee Fête,' in Hyde Park, and 'Jubilee Reflections' may be held to justify the title of the book. The plan of adapting one reading book for the two Standards which have in so many schools to be taught together is a common-sense arrangement, and will help to make this Reader widely acceptable.

Clarendon Press Series: Milton. Paradise Lost. Book I. Edited by the Rev. H. C. Beeching.

In this edition the text of the First Book of the great English epic is preceded by a short introduction on the Life and Works of Milton, and the nature of Epic Poetry, and an essay which for an ordinary reader may be regarded as almost exhaustive on the elements of Milton's blank verse in Paradise Lost. Most abundant notes follow the text; and, so that all classes of students may find advantage in using them, simple explanations are included, as well as more elaborate annotations on peculiarities in Milton's language, and comparisons of certain passages with others from Homer, Virgil, Horace, Tasso, Spenser, Shakespeare, and other writers.

Clarendon Press Series: Johnson's Lives of the Poets. Milton. Edited, with Notes, &c., by C. H. Firth, M.A. Oxford: Clarendon Press.

Johnson's Life of Milton deals in many respects unfavourably with the great poet. Still it is a work of classical rank, and deserves the careful attention of the student. In this edition Mr. Firth increases the advantage of a study of the work by his carefully written introduction, and by the copious and scholarly notes which serve not only to illustrate and explain the text, but to correct mistakes and wrong impressions which Johnson's sentences may convey. In his annotations the editor has drawn from Milton's own works, from records of his contemporaries, from Johnson's other writings, from Dr. Hill's edition of Boswell's Life of Johnson, from Professor Masson's Life of Milton, and many other sources to elucidate the text.

Code Wrinkles. Selected by J. L. Richardson. London: George Philip and Son, 32, Fleet Street.

A little booklet of about forty pages, with an index, containing official decisions respecting difficulties which have arisen in the interpretation of Codes, Minutes, and Circulars, and in the practical management of Schools. It will be a handy little reference book for both managers and teachers.

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The 'Practical Teacher' Sale and Exchange Column.

Wanted.—Nos. 21, 27, 28, 29, 37, 38, 39, of last issue of 'Cassell's Popular Educator.' Will exchange first twelve Nos. of 'Cities of the World,' or cash.—Geo. W. Phillips, St. Helens, I. W.

A. G. DAWSON'S EDUCATIONAL SERIES.

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THIS Series of GEOGRAPHICAL READERS covers the entire range of the Standards from I. to VII., and meets, in every particular, the latest requirements of the 'Revised Code.'

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Shakspere's 'Macbeth.'

BY J. L. KINTON, B.A.,

Late Lecturer on English Literature at the Westminster Training College.

THE Syllabus issued by the Education Department, which enumerates the subjects required in the Government Examination for Certificates to be held next December, includes, under the head of English Grammar, Shakspere's play of 'Macbeth.' This applies both to Male and Female Candidates. The latter, according to the Syllabus, are 'to answer questions on the language, style, subject matter, history, and authorship,' and to paraphrase a passage from the play. It is, therefore, proposed to furnish in the pages of THE PRACTICAL TEACHER a series of articles on the subject, which, it is hoped, will fully meet the necessities of those who are preparing for the Christmas examination, and which at the same time may be of service to teachers and other students of English literature.

We intend to give the text of 'Macbeth,' with comments on such passages as require explanation, always bearing in view the requirements of those for whom the articles are specially designed. But before commencing this, the main part of our work, it will be necessary to make a few preliminary remarks on certain matters involved in the study of Shakspere. Among these might be enumerated many matters common to the study of literature in general, others referring specially to poetry and the drama, and others again more particularly bearing on Shakspere's plays. Out of a great variety of topics we will, however, confine our attention to such points as are indicated in the Syllabus. And in doing this, only a brief sketch of each point thus selected will be given at this stage: a fuller treatment of some or all of them will be more convenient further on; and, meanwhile, the mention of a few standard and easily accessible works will guide those who may desire to pursue the subject more fundamentally and extensively than is requisite in the study of a single play, and that merely for the certificate examination.

I.—With regard to the *Language* of Shakspere, it is always to be borne in mind that it represents English as spoken about three centuries ago, which, although essentially identical with that of our own time, exhibits innumerable shades of difference in the form and uses of words, and especially in their syntactical connections. The differences would be more manifest to us if it were not that we are accustomed to the same form of speech in the Authorised Translation of the Sacred Scriptures, and in the Book of Common Prayer. Shakspere's period of literary activity extended over about a quarter of a century, from about 1588 to about 1612, or in round numbers from 1590 to 1610 (he died in 1616). The Authorised Version of the Bible was published in 1611. As the Prayer Book was first issued in the reign of Edward VI., it represents English of a slightly earlier time, but the term *Tudor English* embraces the peculiarities of the language as appearing in these three and other contemporary works. Moreover, as the Bible of 1611 was mainly a revision of older translations, its style, like that of the Prayer Book, is somewhat more antiquated than Shakspere. Still, the differences are unimportant, and it is thus a remarkable fact that we have in common use these venerable books, constantly keeping in our ears this older stage of the language, and thus serving to facilitate our comprehension of Shakspere's writing, as far as mere forms of speech are concerned.

Of course the peculiarities and distinctions existing in Tudor-English are far less striking than those by which the older stages of the language are marked. In reading Chaucer, a glossary is absolutely necessary for a beginner, and he has many old grammatical forms. Layamon, writing in the time of Henry II., in what is called Early English or Semi-Saxon, is unintelligible without special study, both of the words and inflections which he uses, the former being almost entirely of native origin, and the latter requiring a distinct grammar; while the same remarks apply in a still higher degree to the earliest English or Anglo-Saxon. Compared with these, the differences between our present form of speech and that of our forefathers in the sixteenth century are, for the most part, of a more delicate character. Some, however, are more strongly marked, and all need careful observation and study, the more careful indeed, as they are more fine and subtle. The chief matters to be considered as to the language of the play may be classed under the following heads:—

(1.) First, may be noted obsolete words, that is, such as are wholly unused at the present day. Examples from Macbeth are—*aroint; ronyon; shough; seel, scotch, skarf* (*verbs*): *halter, slab* (*adj.*); *affeered, sag, foisons.* Words like *tarry, marvel, list* (to please), *travail, abide, lack,* would long since have disappeared from the language but for their use in the Bible, and are thus to be considered antiquated, if not obsolete; and the same may be said of those of which the roots still exist, although the words themselves are unused in ordinary English, *e.g., handmaid, husbandman, firmament, froward, stronghold.*

(2.) Obsolete *forms* of words are very common, differing from their modern cognates merely in prefixes and affixes, or other minor incidents. Thus we find *unpossible, infortunate, ugsome, equalness, angerly, ravined* (for *ravenous,* Macbeth, iv. 1), *treasonous, measureless, limbeck* (i. 7). Some of these require special observation, since, from the freedom which characterises Tudor-English, they are occasionally incorrectly formed and used. Thus, words in *-ive* as *unexpressive* (for *inexpressible*) are used with a passive signification. And many obsolete formations exist to which there is now nothing directly answering, *e.g., beweep, fords, twiggen, fielded, pauser* (Macbeth, iii. 3); *memorize* (ii. 1).

(3.) Obsolete and antiquated *significations* of words; that is, the words still exist, unchanged in form, but with new meanings. This is an extensive and interesting branch of the subject, and admits of more systematic and thorough treatment than can be given to it here. The study of derivation is of importance in this connection, as the original, or older, will generally illustrate their various later meanings of words. It may be stated (1) that every root has a material, physical signification, and from this new, non-material, figurative meanings spring. But (2) the original meaning does not always remain; it may be modified by some added subordinate idea, which eventually becomes the prominent one, and displaces the first. Thus *pagan* entirely loses its original sense of a *villager,* through the fact that the country people were converted to Christianity later than the townspeople, and comes to mean a *heathen,* which latter word is similarly connected with *heath.* (3.) Other changes of signification are classified as from indifferent to good or bad, from good to bad, or from bad to good; from a stronger to a weaker, and from a wider to a narrower meaning, or *vice versa,* with some less important, of which may be mentioned, (4) the passing of a word from a higher to a lower style of speech, becoming puerile (as *naughty*) or mean and vulgar. And allied to the last are (5) words found only as provincialisms at present, but many of which appear in the older authors. Several of Shakspere's words are thus illustrated.

Works on the history of words may be consulted on the subject of the three last paragraphs: those by Archbishop Trench are specially instructive. The Globe and some other editions of Shakspere are followed by glossaries; the fullest is Dyce's, which forms the last volume of his edition of the poet.

(4.) Obsolete grammatical forms, and the use of forms which are still extant, but in modes not antiquated. The former are few, the latter very numerous. *Hosen* is an obsolete plural; *help, holp, holpen,* is an instance of a verb formerly conjugated Strong, but now Weak. *Withal, whiles, sith* and *sithence, an* (for *if*), *whenas,* are old forms of particles. *His* and *whose* were possessives of the neuters *it* and *what* as well as of *he* and who; *which* was of three genders; and *whether* was used as interrogative of two objects; *either* was used as the present *both.* The original singular second personal pronoun, though still used in the language of devotion, and in some provincial districts, is otherwise practically obsolete, though put as the only singular form in all modern grammars; while in Shakspere's time, and for half a century subsequently, the use of the plural *you,* &c., in speaking respectfully to superiors, and of the singular *thou,* &c., in familiar, affectionate, and devotional language only, led the way to the present usage. *Ye* was originally the only nominative form, and *you* its objective, but in Tudor-English they became confounded; *ye* frequently appears as objective, and *you* as nominative, till finally *you* has become the only ordinary form for both cases.

One great peculiarity of the language at this period, its most characteristic feature indeed, is the existence of more than one synonymous grammatical form; the older form existing side by side with another more recent, which supplants the earlier. Sometimes there will be several such forms; thus, in the neuter of the third personal pronoun mentioned above, of which *his* was the original possessive case, Shakspere and his contemporaries have, besides *his,* the forms *thereof, of it, it,* and finally *its,* the latter being an entirely new growth and at length the only form used. It was possible at that time to say, 'the tree and *his* fruit,' or the fruit *thereof,* or the fruit *of it,* or *it* fruit, or *its* fruit. Similarly, with regard to the possessive of the interrogative and relative pronoun neuter (originally *whose*), *whereof,* and *of which,* were also in use; but the latter phrase is now the common expression for the possessive of *which* and *what,* though *whose* is still used in poetry and elevated prose.

It is highly instructive to trace the causes which led to the adoption of these various forms, the mode of formation, and the reasons for the prevalence of some particular one among them. Thus with regard to *its,* the old English genitives of the third personal pronoun were identical.

$$\begin{array}{lcc} & \text{Mas.} & \text{Neut.} \\ \text{Nom.} & \text{he} & \text{hit.} \\ \text{Gen.} & \multicolumn{2}{c}{\underbrace{\hphantom{\text{he}\quad\text{hit.}}}_{\text{his}}} \end{array}$$

While things without life were in the older tongue (as in Latin and German) as often of the masculine or feminine gender as of the neuter, this was not felt to be inconvenient; but when gender became conformable to nature, as in modern English, an incongruity was perceived in using *his* of an inanimate object. Hence arose the new tentative expressions as substitutes; the compound *thereof,* formed like many others at that time from an adverb and preposition; the phrase *of it* (or of *that*), the simple nominative (or objective) *it,* without any sign of relation, and at length, *its* (formed like the possessive of nouns), which though a philological barbarism, commended itself by its convenience, and so swallowed up the rest.

Here may be mentioned the extensive use of the subjunctive mood: the expletive, non-emphatic *do* and *did* as present and past auxiliaries, with the opposite usage in the formation of questions without *do* and *did* (They did eat; Lovest thou me?), with many others. Those already referred to are among the more simple and obvious facts bearing on this part of the subject, and may be met with on almost any page of an Elizabethan writer. Others exist in abundance, and may be studied in works specially devoted to the subject, or they may be treated as they occur in the course of reading.

5. Obsolete and antiquated syntactical forms. These will be merely alluded to; and, indeed, as far as the syntax of inflections is concerned there is not much to treat of, but if we include the use of the various parts of speech and the sub-classes, the idioms of the whole language of that time as existing in its literature are brought before us, and a most fruitful form of study is presented, especially when compared with present English. Some points of particular interest are the deviations from the first concord, as seen in the frequent use of a singular verb with a plural subject; the peculiar constructions of the infinitive and the so-called gerund, among which may be enumerated those which have now become vulgarisms (as, I go a-fishing; What went ye out for to see?) the double comparatives and superlatives, and double negatives, and the various antiquated uses of moods and tenses of verbs, and of pronouns and particles. A systematic treatment of such topics as are referred to in this and the preceding paragraph will be found in Dr. Abbott's excellent 'Shakespearian Grammar,' a work which every one who studies the works of our poet ought constantly to refer to.

II.—Under the head of language and *style* may be classed matters of poetic diction and versification, together with such rhetorical usages as are characteristic of the Elizabethan times, and more especially all that is distinctive of Shakspere as a writer, leaving out of view as far as possible what he writes about—his subject-matter.

Much has been written of late upon the subject of Shakspere's metre, and the variations to be found in it at different parts of his poetical career, and elaborate arguments have been founded upon them with reference to the dates of his plays, particularly those about which there is any uncertainty. His metre, the ordinary English Iambic Pentameter—consisting, that is, of five feet of two syllables each, with the accent on every second foot—is subject to various modifications. The accent is frequently reversed; an additional short syllable is sometimes found at the end, and more rarely within the line, and occasionally he has an Alexandrine of six Iambic feet. The lines are usually unrhymed, but at the end of a scene and elsewhere rhymes are met with. Other irregularities, acknowledged by the older commentators, are by recent writers referred to the contraction of two syllables into one, or the stretching out of one syllable into the place of two, often in a somewhat Procrustean manner. The recent school also direct attention to the prevalence of rhyming lines and 'end pauses' or 'stopped lines' in his earlier plays; while the absence of rhyme, and the increasing freedom of metrical style as seen in *light* and *weak endings*, mark his middle and later works. *Light endings* consist of such words as the auxiliary verbs and personal pronouns, which have only a slight tone; *weak endings* are such as the shortest conjunctions and prepositions. Feminine endings—that is, feet with additional short syllables at the end of lines—are also common in the poet's later style.

As to rhetorical forms, the Elizabethan style was full of them to exuberance. The critics of the age of Dryden, Pope, and Johnson, regarded this peculiarity of the older school of poets as contrary to good taste, and their opinion may be received with regard to the more extravagant figures in which their predecessors indulge. But the more catholic criticism of our own times, while not indifferent to æsthetic laws, rather admires the rich and glowing fancy of the older school than the cold precision of the so-called Augustan age.

There was, it is true, an extravagant artificiality which prevailed for a time among the Elizabethan writers and to which the name of *Euphuism* is applied. Shakspere seems to have fallen into this style in some of his works, but he more often satirises it. And the leading characteristic of the period is certainly rather the excess of naturalness than excess of art. Figures of speech when far-fetched or worked out beyond the ordinary bounds of what is generally considered good taste, are called *conceits*. And with these may be ranked the frequent confusion of more than one figure in the same passage, a thing hateful to writers on rhetoric, but which when found in Shakspere is merely the unrestrained overflow of his poetic genius. But here, again, there is variety in his style at various parts of his life, and it is chiefly in the middle period, when his greater works were written, that his thoughts appear too big for words and seek to express themselves in language which, sometimes, and by some classes of mind, may be considered as extravagant.

III.—The language and style lead to the consideration of the *matter* of the play. This includes the plot, the characters, and the whole treatment of the subject by the dramatist. As to the incidents on which Shakspere's plays are founded, they were seldom, if ever, invented by himself, but were derived from history, from romances and poems, and sometimes they were modifications of previously existing dramas on the same subject, the latter being chiefly the case in his very early works.

It is chiefly in his artistic handling of the theme, and especially in his development and representation of human character in its multiform manifestations that Shakspere is so great. His men and women are living beings, of like passions with ourselves, each having his or her own phase of character, and acting in accordance with their peculiarities of nature and disposition under certain given relations. He appears, moreover, as the German critics, especially Gervinus, show, to have generally worked out a predominant idea in most of his plays. Thus as has been often stated, Hamlet represents a man in whom the intellect and emotions are stronger than the will, set to perform a great work—a work indeed, too great for one of his type to accomplish successfully. And in Macbeth, we have one who appears at first as a brave and loyal subject falling under the influence of temptation, and gradually passing from good to bad and from bad to worse, till he becomes almost a demon.

(To be continued.)

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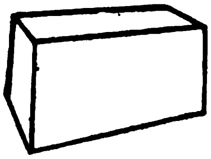
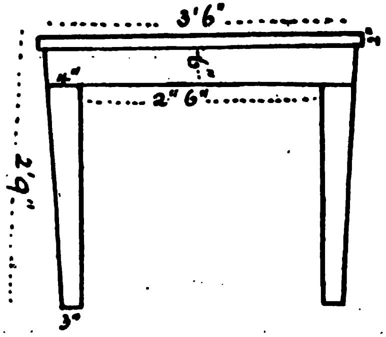
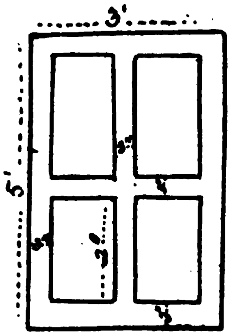


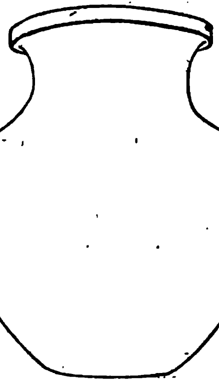
Examination F.—For Model Drawing the rectangular prism was placed on a blackboard upon the floor, but in this instance the blackboard was not to be drawn.

The card given to each child using plain paper for Scale drawing was similar to that used in *Examination E.*

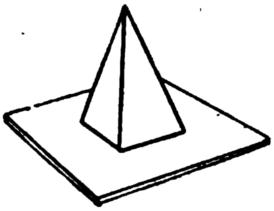




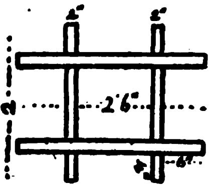
The card given to those who used squared paper contained two copies; for the first each square represented one inch, and for the second each square represented 2 inches.

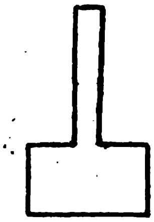


A sheet of paper was placed on a blackboard, to the left of the class, with the Freehand copy upon it. The children were told to draw a figure as large as their paper would permit.

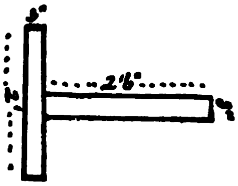


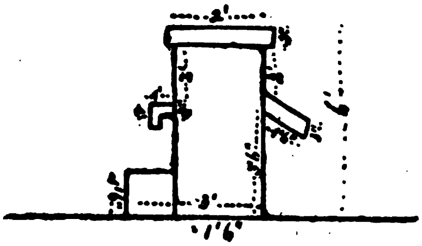
Examination G.—The Model in this Examination was a square pyramid standing upon a blackboard. The blackboard was placed on the floor to the right of the class, and consequently its sides were not parallel to the eye of those who drew it.





The first figure on the card for those who used plain paper was to be drawn to a scale of one inch to the foot, and the second to be copied three times the given size.



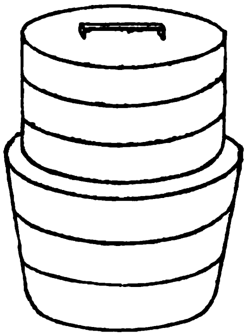


The card given to those who used squared paper contained two copies to be drawn, allowing each square to represent 1 inch and 2 inches respectively.

The Freehand copy was similar to that given in *Examination D.*

STANDARD V.

The work in this Standard consists of Freehand, Geometry, and Model Drawing; consequently the class is divided into three sections for examination purposes. The inspector usually selects an object in the room, such as a cupboard, a desk, or a chair, for the Model drawing, so that the teacher should carefully prepare the children in this style of work.



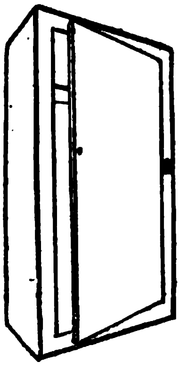
Examination A.—The freehand copy was on a large sheet of paper and was fastened to the door of a cupboard in front of the class.

The Geometry Card given to each child in the section contained three questions.

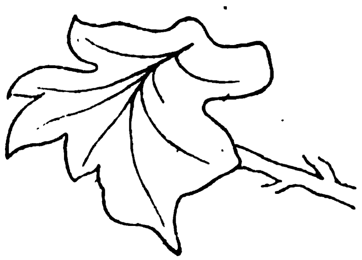
(1) Copy the two given points A and B, join them by a straight line, and construct an equilateral triangle upon that line.

(2) Construct a right angle, and divide it into four equal parts.

(3) Construct two circles touching each other, the one with a radius of an inch, and the other with a radius of half an inch.



The third section, which had Model Drawing, consisted of the two front rows of the class. They were set to draw the cupboard which was in the right hand corner of the room. The door of the cupboard was open a short distance.

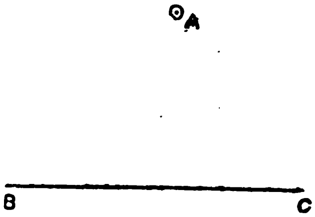


Examination B.—The Freehand section had a copy placed in front of them, of a leaf and stem, of which they were told to make a copy.

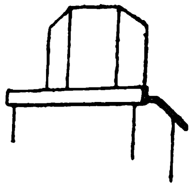
The Geometrical Card contained three questions which were:—

(1) Construct a triangle having a base of 2 inches and angles of 60°, 45°, and 75° respectively.

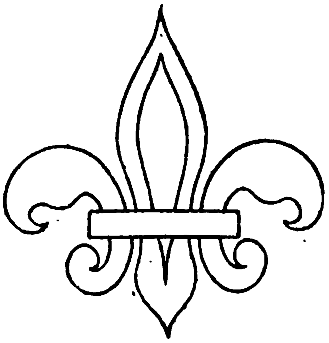
(2) Construct a square with sides of 2 inches each.



(3) Copy the given point A and the given line B C. From A draw a line perpendicular to the line B C.



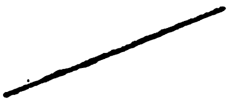
For Model the boys were given a hexagonal prism standing upon the top of a teacher's desk, the top of the desk to be drawn.



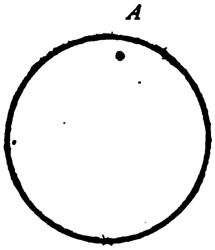
Examination C.—The Freehand copy consisted of a bi-symmetrical figure, which was placed before the class.

The Geometry card, given to alternate scholars, contained the three following questions:—

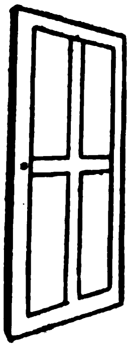
1. Describe an equilateral triangle with sides of two inches each.



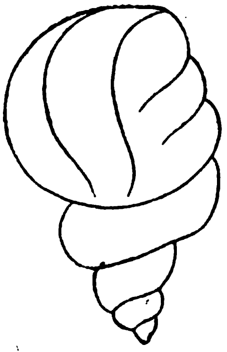
2. Draw a line like the given line, and make another parallel to it, at a distance of one inch from it.



3. Describe a circle similar to the given circle, and with the same radius, describe a second circle touching it at the point A.

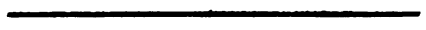


Each child in the third section was told to make a drawing of the class-room door which was open.



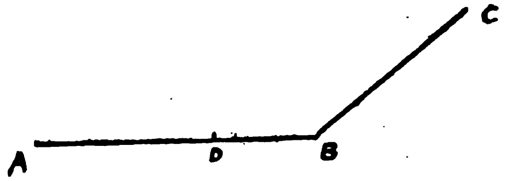
Examination D.—The Freehand copy was placed before the class and was drawn by alternate boys. It was a shell.

The Geometry card had three questions, which were:—

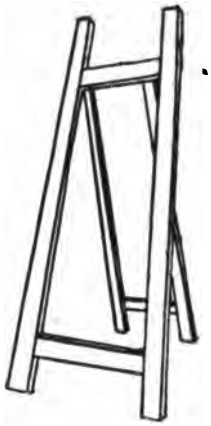


1. Copy the given line and draw another of the same length parallel to it at a distance of one inch.

2. Construct an equilateral triangle with sides of two feet each. (Scale 1½ in. to the foot.)



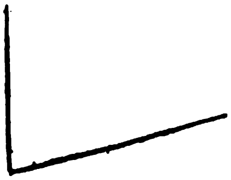
3. Copy the given figure. From the point D draw a line parallel and equal to BC.



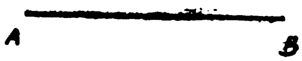
The model given was to draw an ordinary easel placed at an angle to the desks in which the children were sitting.

Examination E.—The Freehand copy was like that given in *Examination B.* The three questions on the Geometry card were:—

1. Construct a triangle having two sides of 1½″ and 2½″ respectively.

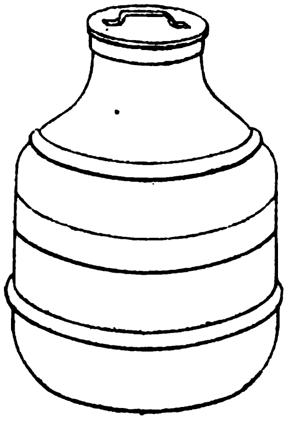


2. Copy the given angle and construct another twice the size of the given one.



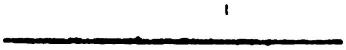
3. Copy the line AB and construct a line at right angles to it from the point B.

There was no model.



Examination F.—The Freehand copy was placed before the class as in each of the other examinations.

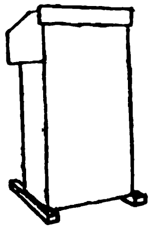
The Geometry card contained the following three questions:—



1. Copy the given line and divide it into five equal parts.

2. Construct an isosceles triangle having sides of 2 inches and each of the equal angles of 45°.

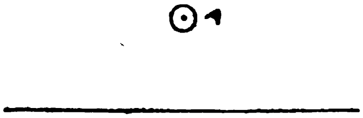
3. Describe a circle with radius of $\frac{3}{4}''$ and another with radius of 1″ touching it.



The section of the class taking Model Drawing had to draw a Pupil Teachers' desk.

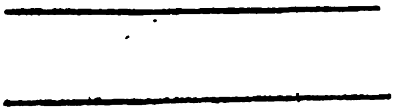
Examination G.—Each child in the Freehand section was given a copy upon a card. There were several figures similar to those of which sketches have been given in other Examinations. The children were told to enlarge their drawings so as to fill each paper.

The second section taking Geometry were also given cards. These cards consisted of different sets of questions. There were the same exercises as those given in *Examinations A, D,* and *E,* as well as the following:—



1. Copy the given line and drop a perpendicular upon it from the given point A.

2. Construct an isosceles triangle upon a base of 2 inches with a vertical angle of 45°.

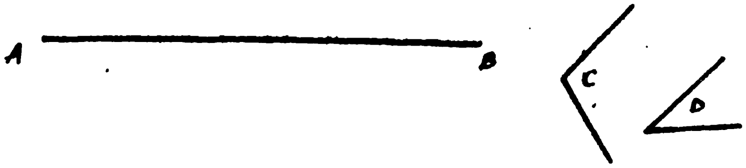


3. Copy the given lines, and draw another parallel to them and midway between them.

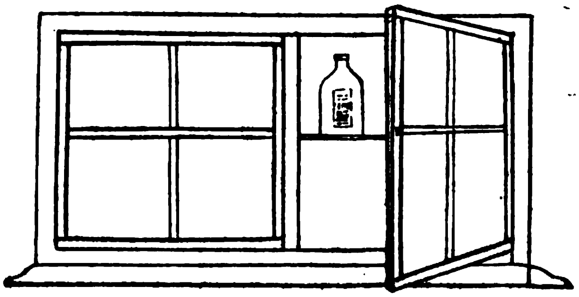
Another Card:—

1. Draw a line three inches in length and divide it into seven equal parts.

2. Construct an angle of 30° and bisect it.



3. Copy the given line AB, and make an angle at A equal to the angle C, and an angle at B equal to the angle D.



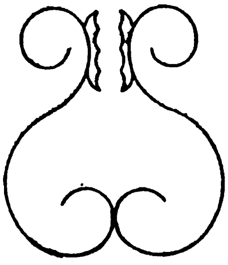
There was a cupboard in the room (consisting really of two cupboards, one upon the other), and the Model section had to draw the bottom part of it, one door being open.

STANDARD VI.

The work in this Standard also consists of three parts, but up to the present the number examined has been comparatively small, so that in some instances the whole three sections have not been given.

Examination A.—In this examination the children were not examined in Model and Geometrical Drawing. The Freehand copy was pinned in front of the class. It was exactly like the first figure in the official syllabus for Standard VI.

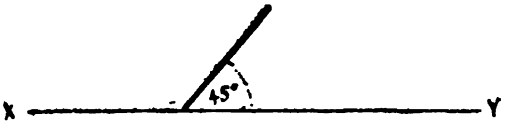
Examination B.—In this examination all the children were presented for *certificates of merit,* so that *each* child was examined in Freehand, Geometrical, and Model Drawing.



The Freehand copy was placed before the class, but was not distinctly seen by all the scholars.

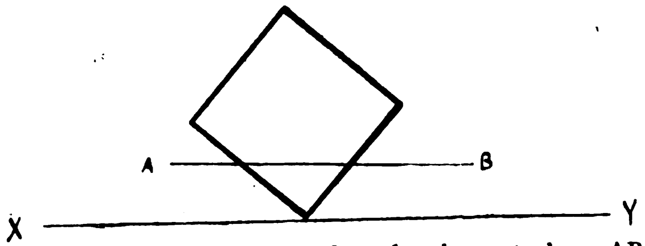
The Geometry card contained two questions only, which are given, viz.,

1.



This is the elevation of a square, two sides being perpendicular to the vertical plane, and the other two at an angle of 45° to the horizontal plane. Copy this and draw the plan.

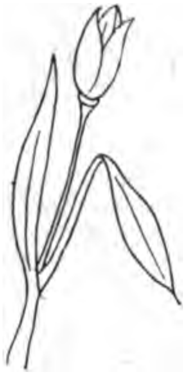
2.



This is the elevation of a cube, the part above AB having been taken off. Copy the figure and draw its plan.

The Model consisted of the group given in the syllabus, which contains a book, teacup, saucer, and spoon.

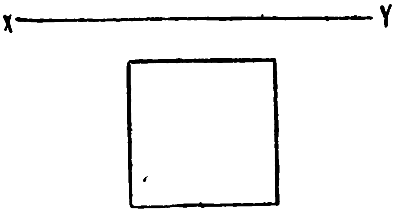
(The time allowed in each section was 40 minutes.)



Examination C.—The class was divided into two sections only, no model being set. The Freehand copy was placed in front of the class. It was a floral design.

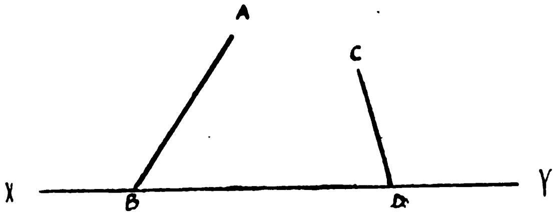
The Geometry card contained two problems only. They were:—

1.



The given figure is the plan of a right prism. Its altitude is to be 2″. Copy it and draw its elevation.

2.

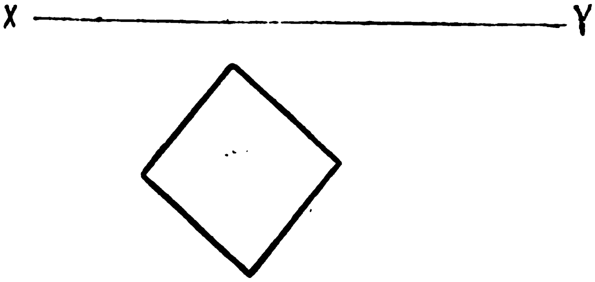


AB and CD are the elevations of two right lines. Copy them and draw their plans.

Examination D.—The Freehand copy was placed before the class, and the children who drew it were told to be careful to have a *large* copy on their papers. The figure was the same as that given in *Examination C.*

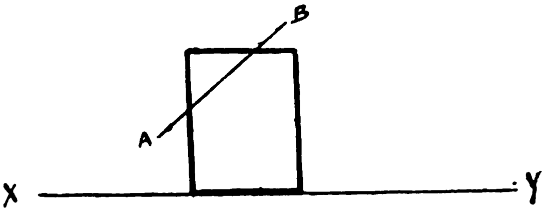
The scholars who took Geometry were placed in different desks and in positions that insured that each one did his own work, and could not copy from his neighbour. The card contained these two problems:—

1.



This is the plan of a cube; copy it and draw its elevation.

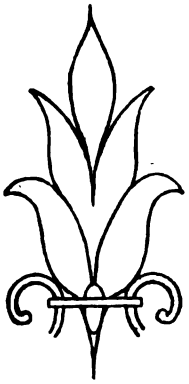
2.



This is the elevation of a prism, the base of which is a square. It is standing on its base. Copy it, and draw the elevation, showing the section marked by the plane AB.

The model was an easel, similar to that given in *Examination D* for Standard V.

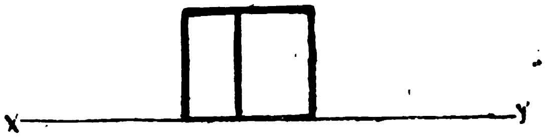
Examination E.—The children were examined for *certificates* in this instance, so that each one had to do Freehand, Geometry, and Model.



The Freehand copy was placed in front of the class. It was a bi-symmetrical figure.

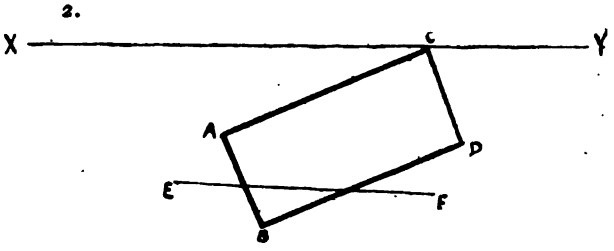
The cards given in Geometry were of three kinds. There was one like that given in *Examination D*, and the two which follow:—

1.

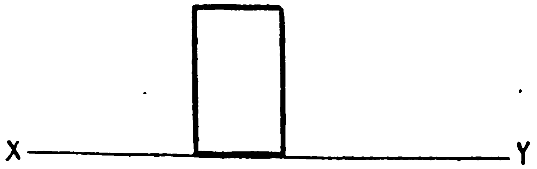


This is the elevation of a cube. Copy it, and draw its plan.

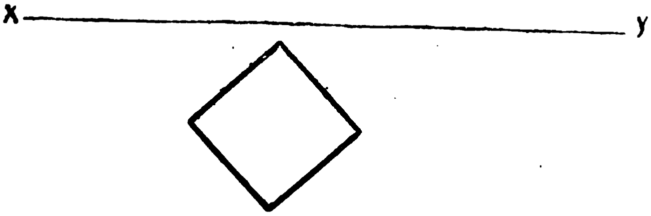
2.



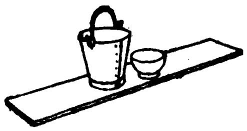
This is the plan of a right prism. Its bases AB and CD are squares. Copy it, and draw its elevation, showing the section made by the plane EF.



1. The given figure is the elevation of a square. Copy it, and draw its plan.



2. The given figure is the plan of a right prism. Its altitude is to be 2". Copy it, and draw its elevation.



The model set consisted of a blackboard upon which a basin and pail were placed.

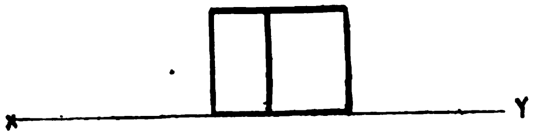
Examination F.—As no certificates were tried for in this examination, the class was divided into three sections.

The Freehand section had a copy similar to that given in *Examinations C and D.*

There were three cards given in Geometry. They were as follow:—

(*Card I.*)

1.

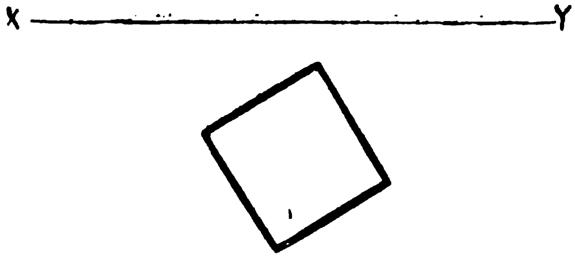


The given figure is the elevation of a cube. Copy it and draw its plan.

2. Give the plan and elevation of a cube of 1½" sides. The solid rests upon the H. P. on one of its faces, and one diagonal of this face is parallel to the V. P.

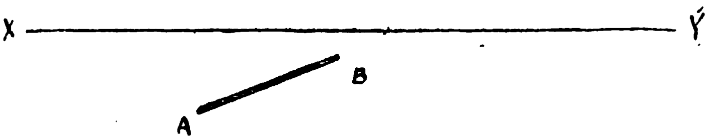
(*Card II.*)

1.



The given figure is the plan of a right prism standing on its base on the H. P. The altitude is to be 2". Copy it and draw its elevation.

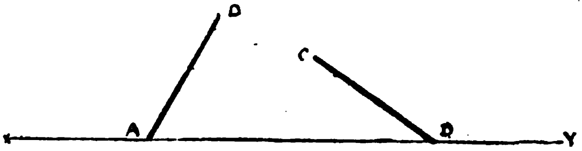
2.



The right line AB is the plan of a line 2½" long. The end A is standing on the H. P. The end B is above. Copy it, and draw its elevation.

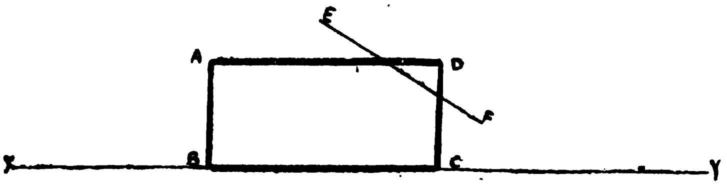
(*Card III.*)

1.

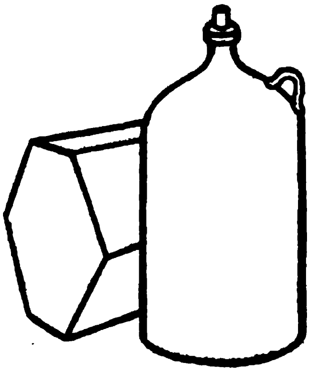


AB and CD are the elevations of two lines which are parallel to the V. P. Copy them and draw their plans.

2.

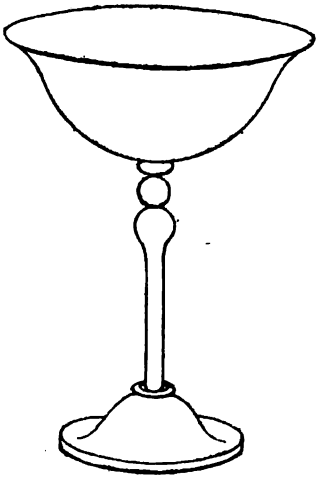


ABCD is the elevation of a right prism, the two ends of which are squares. Copy the figure and draw its plan, showing the section cut off by the plane EF.



The section taking model had a group similar to that given in the syllabus, in which the hexagonal prism is given, but in this instance an 'ink jar' was used instead of the vase.

Examination G.—The children were examined for certificates, consequently each child did the work set in Freehand, Model, and Geometry.

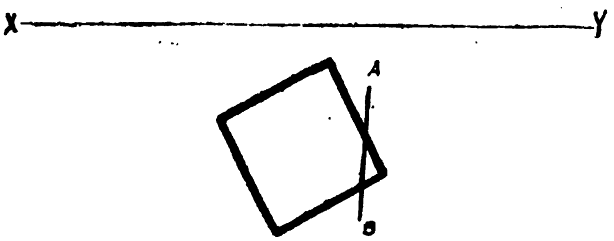


The Freehand copy was one of the 'common objects' of which there are specimens given in Standards III., IV., V., and VI. in the official syllabus. In this instance it was a wine glass.

There were two different cards given in Geometry. The following were the problems:—

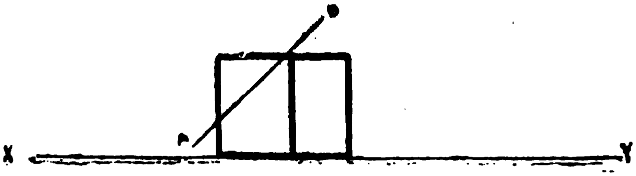
(*Card I.*)

1.



The given figure is the plan of a cube. Copy it, and draw its elevation, showing the section cut off by the plane AB.

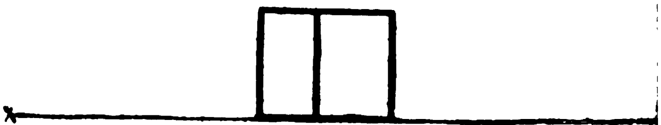
2.



This is the elevation of a right prism both ends of which are squares. Copy it, and draw its plan, putting in the section cut off by the plane AB.

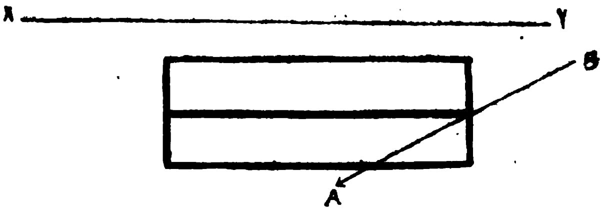
(*Card II.*)

1.

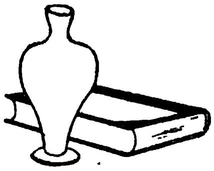


The given figure is the elevation of a cube. Copy it, and draw its plan.

2.



The given figure is the plan of a right prism. Copy it, and draw its plan, showing the section which is cut off by the plane AB.



The model consisted of a group similar to that in the last named examination. A vase and a book were placed on a blackboard, resting upon a chair. The blackboard was not to be drawn.

—o—

Quarterly Arithmetical Tests.

STANDARD I.—FIRST QUARTER.

1.
5
74
280
439
66

2.
359
26

3.
584
530

4.
11 × 2;
7 × 4;
3 × 3.

SECOND QUARTER.

1.
738
14
500
6
392

2.
420
206

3. Take 7 from 80

4.
4 × 6;
9 × 3;
5 × 8.

THIRD QUARTER.

1. 65
650
7
98
809

2. 300
11

3. 472
274

4. 6 × 9;
7 × 5;
4 × 12.

STANDARD II.—FIRST QUARTER.

1. 37,459 + 605 + 4,710 + 5,096 + 28 + 16,007.
2. Take 37 from twenty thousand.
3. 4,690 × 49.
4. 18d.; 33d.; 46d.

SECOND QUARTER.

1. Multiply 87,065 by 870.
2. 36,312 ÷ 4. Write the answer in words.
3. A man rides 7 hours per day at the rate of 6 miles an hour. How far will he ride in 19 days?
4. 77d.; 96d.; 109d.

THIRD QUARTER.

1. Divide the sum of 37,209 and 26,295 by 8.
2. 93,758 × 6,053.
3. I had 864 nuts, and I divided one third of them among a dozen boys. How many did each boy receive?
4. 113d.; 125d.; 131d.

STANDARD III.—FIRST QUARTER.

1. 43,290 ÷ 78.
2. If twenty thousand nuts were divided among 150 boys and 160 girls, and each boy got 80, how many did each girl get?
3. How often is 69 contained in ninety-three thousand one hundred and fifty?
4. A greengrocer bought 21 sacks of potatoes, each containing 180 pounds. If he sell 140 pounds daily, how long will it take him to sell all?

SECOND QUARTER.

1. Add together £756 10s. $7\frac{3}{4}$d., £4,085 12s. $10\frac{1}{2}$d., £19,607 15s. $8\frac{3}{4}$d., £8,009 18s. $6\frac{1}{4}$d., and £328 6s. $11\frac{1}{2}$d.
2. Take £7 16s. 11d. from £304 12s. $10\frac{3}{4}$d.
3. In a mixed school there are 257 girls, and 38 more boys than girls. What is the total number of scholars?
4. There were 576 oranges in a box. A sixth part were not fit for sale. What would be received for the remainder at 9d. per dozen?

THIRD QUARTER.

1. What must you add to nine hundred and five pounds seventeen shillings and six pence three farthings to make one thousand and one pounds one shilling and a penny?
2. If 1,500 apples have to be divided among 76 boys, but 56 are bad and are thrown away, how many will each boy receive?
3. £280 17s. $6\frac{1}{4}$d. + nine thousand and seventeen pounds twelve shillings and eight pence halfpenny + £75 14s. $11\frac{3}{4}$d. + three hundred and ninety pounds three shillings and three halfpence + £6 19s. $8\frac{1}{4}$d. + two thousand and four pounds sixteen shillings and five pence three farthings.
4. By how much does 768 pounds exceed 768 shillings?

STANDARD IV.—FIRST QUARTER.

1. Multiply 16s. $9\frac{3}{4}$d. by 706.
2. Seven men had together 25 guineas. Three saved 8s. 3d. each, two saved 6s. 5d. each, and the remainder was spent. How much was spent?
3. A farm of 190 acres is let for £2,379 15s. What is the rent of one acre?
4. Multiply £584 2s. $1\frac{1}{2}$d. by 79, and divide the product by 474.

SECOND QUARTER.

1. How many 2 lb. packets can be made from a quarter of a ton?
2. Reduce three million thirteen thousand and thirty inches to leagues, miles, yards, &c.
3. How many square yards are there in half a square mile?
4. A wished to exchange 30 gallons of rum at £1 5s. per gallon with B for ale at 1s. 6d. per gallon. How many gallons of ale should he receive?

THIRD QUARTER.

1. How many seconds are there in the months of January and February, 1889?
2. Find the value of half an acre of land at 3s. 10d. per square yard.
3. How many half-pint glasses can be filled from 17 hogsheads of beer, each containing 54 gallons?
4. A ton of sugar was bought for twenty guineas, and sold at $2\frac{1}{2}$d. per lb. How much was gained?

STANDARD V.—FIRST QUARTER.

1. What is the value of seventeen thousand and nineteen caps at elevenpence three farthings each?
2. Find the cost of 15 stone 13 lbs. 10 oz. at 18s. 8d. per stone.
3. In a year 39,807 ounces of gold were exported from Australia. Find the value at £3 17s. $10\frac{1}{2}$d. per oz.
4. What would be the cost for 13 miles 6 fur. 19 po. at £5 13s. 4d. per mile?

SECOND QUARTER.

1. If a boy walk 330 yards in 5 minutes, how long will it take him to walk $2\frac{1}{4}$ miles?
2. A gentleman's income is 700 guineas, and he saves £178 7s. 6d. How much does he spend daily?
3. Bill:—

$19\frac{1}{2}$ lbs. sugar at $3\frac{1}{2}$ per lb.;
25 lbs. candles at $8\frac{1}{2}$d. per lb.;
$13\frac{1}{2}$ lbs. plums at $5\frac{1}{2}$d. per lb.;
$3\frac{1}{4}$ lbs. tea at $2\frac{1}{2}$d. per oz.;
11 lbs. 10 oz. rice at 4d. per lb.

4. If 17 stone of flour cost £1 9s. 9d., what is the value of 13 cwt. 3 qrs. 25 lbs.?

THIRD QUARTER.

1. Add $\frac{3}{5}$, $\frac{4}{9}$, $\frac{7}{10}$, $\frac{1}{6}$.
2. From $\frac{1}{3}$ + $\frac{1}{4}$ take $\frac{7}{8}$ − $\frac{5}{6}$.
3. If a ton be carried 60 miles for 7s. 6d., how far would it be carried for 13s. 4d.?
4. From an orange I cut away $\frac{2}{5}$, $\frac{1}{6}$, and $\frac{1}{3}$. What fraction of the orange is left?

STANDARD VI.—FIRST QUARTER.

1. What must be added to $\frac{7}{9}$ of $1\frac{3}{14}$ of $6\frac{1}{8}$ to make the result an integer?

2. Find the continued product of 6·078, ·06078, and ·0006078,

3. Simplify:— $\dfrac{4\frac{1}{3} - 2\frac{3}{4} \text{ of } \frac{3}{5}}{\frac{1}{8} + \frac{5}{6} - \frac{4}{9} \text{ of } 1\frac{1}{2}}$.

4. Find the value of $7\cdot3\dot{5} - 6\cdot\dot{4}\dot{8}$.

SECOND QUARTER.

1. If the ratio of the diameter of a wheel to the circumference is as 7 : 22, what is the diameter when the circumference is 13 ft. 9 in.?

2. Reduce $\frac{5}{6}$ of $\frac{7}{8}$ of a crown to the decimal of half a guinea.

3. If £119 7s. be divided among 3 men and 7 women, giving each woman four times as much as a man, what is a man's share?

4. If $3\cdot\dot{6}$ lbs. cost $11\cdot91\dot{6}$s., what will 2·5 stone cost?

THIRD QUARTER.

1. A can do a piece of work in 15 days, and A and B can do it in 9 days. How long will it take B by himself?

2. Find the amount of 15 guineas in 15 years at $3\frac{1}{3}$ per cent., simple interest.

3. A man owns ·59 of a ship, and his brother owns the rest. The difference in the value of their shares is £589 10s. Find the value of the ship.

4. In what time will £650 amount to £728 at 4 per cent.?

STANDARD VII.—FIRST QUARTER.

1. If $8\frac{1}{2}$ cwt. be carried 35 miles for 5s. 8d., how far should $3\frac{1}{2}$ tons be carried for £4 12s.?

2. What decimal must be added to $\frac{29}{36} + \frac{15}{16} + \frac{11}{12}$ to make the result 3?

3. The carpet for a room 24 feet wide at 3s. 6d. per yard cost 6 guineas. What will it cost for a room 30 feet wide and the same length as the other room at 4s. 9d. per yard?

4. At what rate per cent. will £580 gain £156 12s. in $4\frac{1}{2}$ years?

SECOND QUARTER.

1. A coal dealer sells $17\frac{1}{2}$ tons on Monday, 26 tons 11 cwt. on Tuesday, 18 tons 7 cwt. on Wednesday, 19·45 tons on Thursday, 32 tons on Friday, and 54 tons 19 cwt. on Saturday. What is his average daily sale?

2. A digs $\frac{3}{7}$ of a field in 10 days, and with B's help finishes it in 5 days. How long would B take to dig the whole field?

3. I bought 7 sheep at 59s. each, 4 at 63s., 3 at 50s., and had one given. What was the average cost of each sheep?

4. If $\frac{1}{6}$ of a sheep be worth £$\frac{3}{4}$, and $\frac{5}{9}$ of a sheep be worth $\frac{1}{18}$ of a horse, find the value of 30 horses.

THIRD QUARTER.

1. A tradesman takes off 5 per cent. for ready money, and a purchaser pays £72 4s. ready money. What was the amount of the bill?

2. A boy was apprenticed when he was 14 years old, and a sum of money was placed in a savings bank to set him up in business when he reached the age of 21. If the interest allowed was $2\frac{3}{4}$ per cent., and the sum withdrawn was £1,788 15s., what was the amount deposited?

3. If a shopkeeper gain 4s. 6d. on an article which he sells for a guinea, what is his gain per cent.?

4. A bought a horse for £30, and sold it to B at a profit of $12\frac{1}{2}$ per cent. B sold it to C for £30. What was his percentage of loss?

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	864.	1,650.	1,629.
2.	333.	214.	289.
3.	54.	73.	198.
4.	22 ; 28 ; 9.	24; 27; 40.	54; 35; 48.

STANDARD II.

	FIRST.	SECOND.
1.	63,905.	75,746,550.
2.	19,963.	9,078.
3.	229,810.	798 miles.
4.	1s. 6d.; 2s. 9d.; 3s. 10d.	6s. 5d.; 8s.; 9s. 1d.

THIRD.

1. 7,938.
2. 567,517,174.
3. 24 nuts.
4. 9s. 5d.; 10s. 5d.; 10s. 11d.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	555.	£32,788 4s. $8\frac{3}{4}$d.	£95 3s. $6\frac{1}{4}$d.
2.	50 nuts.	£296 15s. $11\frac{3}{4}$d.	19 apples.
3.	1,350 times.	552 scholars.	£11,776 4s. 6d.
4.	27 days.	£1 10s.	£729 12s.

STANDARD IV.

	FIRST.	SECOND.
1.	£593 9s. $7\frac{1}{2}$d.	280 packets.
2.	£24 7s. 5d.	15 leag. 2 mls. 975 yds. 10 in.
3.	£12 10s. 6d.	1,548,800 sq. yds.
4.	£97 7s. $0\frac{1}{4}$d.	500 gals.

THIRD.

1. 5,097,600 sec.
2. £463 16s. 8d.
3. 14,688 glasses.
4. £2 6s. 8d.

STANDARD V.—FIRST.

1. £833 4s. $5\frac{1}{4}$d.
2. £14 18s. 2d.
3. £154,998 10s. $1\frac{1}{2}$d.
4. £78 5s. $0\frac{3}{4}$d.

SECOND.

1. 1 hour.
2. £1 10s. 6d.
3. 5s. $8\frac{1}{4}$d. + 17s. $8\frac{1}{2}$d. + 6s. $2\frac{1}{4}$d. + 10s. 10d. + 3s. $10\frac{1}{2}$d.
= £2 4s. $3\frac{1}{2}$d.
4. £9 15s. $7\frac{1}{2}$d.

THIRD.

1. $1\frac{41}{45}$.
2. $\frac{13}{24}$.
3. 10[illegible] miles.
4. $\frac{1}{10}$.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	$\frac{31}{144}$.	4 ft. $4\frac{1}{2}$ in.	$22\frac{1}{2}$ days.
2.	·000224533986552.	·3472.	£23 12s. 6d.
3.	$9\frac{7}{35}$.	£3 17s.	£3,275.
4.	$\cdot 8\dot{7}0$.	£5 13s. 9d.	£3 years.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	69 miles.	28 tons $2\frac{2}{3}$ cwt.	£76.
2.	·34027.	14 days.	£1,500.
3.	£10 13s. 9d.	£2 14s. 4d.	$27\frac{3}{11}$ per cent.
4.	6 per cent.	£1,350.	$11\frac{1}{9}$ per cent.

Notes of Lessons on the Oceans.

BY JOSEPH H. COWHAM, F.G.S.,
Master of Method: Westminster Training College.

PART I.

FACTS STATED IN THE ORDER OF TEACHING.

A. Distribution of land and water.

1. If a globe be adjusted so that its highest point is in the centre of St. George's Channels the hemisphere surrounding that point will contain the greatest proportion of land possible. **This forms the Land Hemisphere.**

In this hemisphere the

Land = 44,000,000 sq. miles
Water = 54,500,000 „ „

2. By reversing the globe and thus bringing New Zealand to the highest point, we obtain a view of the hemisphere containing the greatest proportion of water possible. **This is the Water Hemisphere.**

In this hemisphere the

Land = 8,000,000 sq. miles
Water = 90,500,000 „ „

B. The Chief Oceans, their position and size.

1. **The Pacific Ocean** separates North and South America on the east, from Asia and Australasia on the west. It stretches from Behring Straits in the north to the Antarctic Ocean in the south.

The *length* from north to south is **9,000 miles.**

The *breadth* in the south is **12,000 miles.**

The *area* is **67,000,000 square miles.**

2. **The Atlantic Ocean** separates the Old World from the New World, and stretches from the Arctic Ocean in the north to the Antarctic Ocean in the south.

The *length* from north to south is **9,000 miles.**

The *breadth* varies from **5,000 miles** at the Tropic of Cancer to **1,700 miles** between Norway and Greenland.

The *area* is **35,000,000 square miles.**

ILLUSTRATIONS AND OTHER AIDS TO TEACHING.

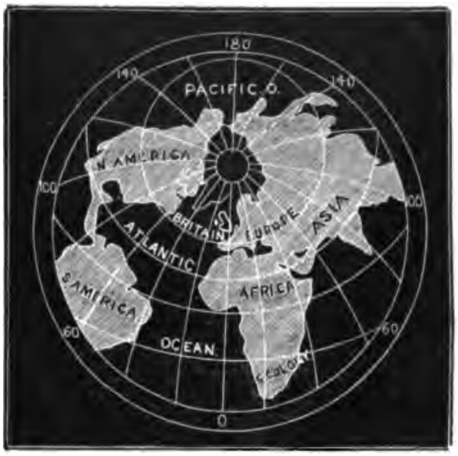


Fig. 1. The Land Hemisphere.

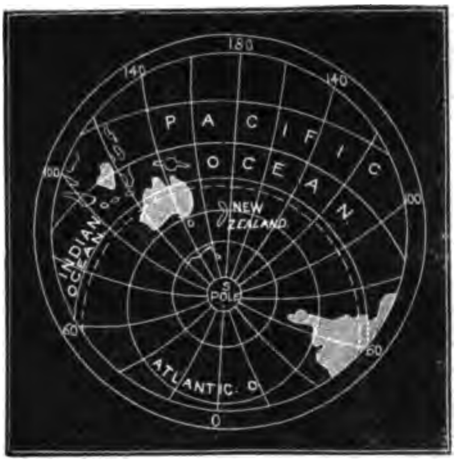


Fig. 2. The Water Hemisphere.

1. Point out the position of each Geographical fact belonging to the Pacific Ocean on a map of the world, or better still on a sketch map prepared to show only the places named.

2. In the same way impress the facts connected with the Atlantic and Indian Oceans respectively.

The figures of length, breadth, and area, may be arranged in teaching so that by bringing out points of contrast and similarity they may be more deeply impressed and readily remembered, as for example :—

1. The length of the Pacific and the Atlantic Oceans is the same, and both are twice as long as the Indian Ocean.

2. The area of the Pacific is almost twice that of the Atlantic, and three times that of the Indian.

Proceed in the same way to impress the facts connected with the Arctic and Antarctic Oceans.

3. **The Indian Ocean** is situated south of Asia. It separates the continent of Africa from the East India Islands and Australasia.

   The *length* from north to south is over **4,500 miles.**

   The *breadth* along the Tropic of Capricorn is **5,000 miles.**

   The *area* is **25,000,000 square miles.**

4. **The Arctic Ocean** round the north pole and the **Antarctic Ocean** round the south pole, are the remaining ocean areas of importance.

   The area of the Arctic Ocean is **5,500,000 square miles.**

   The area of the Antarctic Ocean is unknown.

C. Depth of the Ocean.

How determined:—

1. Formerly a heavy piece of lead was attached to a rope and thrown overboard. This served its purpose in shallow areas, but in the deepest oceans the depth was often greatly exaggerated, chiefly on account of the undercurrents bearing the line away from the vertical position.

   Sometimes sailors failed to reach any bottom at all, or if they did, they were unable to tell when, in consequence of the currents and the weight of the rope continuing to run out the line.

2. The improved method of sounding introduced by Lieutenant Brooke possesses the following features:—

   (*a*) Wire is used in place of rope in order to lessen the effect of the under-currents.

   (*b*) The weight or sinker is made sufficiently heavy to carry the rope down as nearly vertically as possible.

   (*c*) This weight becomes detached as soon as the apparatus touches the bottom, leaving only a tube, used for collecting specimens of the ocean floor, to be raised.

   In Fig. 5 the number 2 is against a sling which is attached to a notch at 1. This slips off when the tube strikes the bottom, and liberates the sinkers 3, 4, 5, 6. In B, figure 7 shows the sling thrown off.

The following diagram will also assist in realizing the relative sizes of the various oceans.

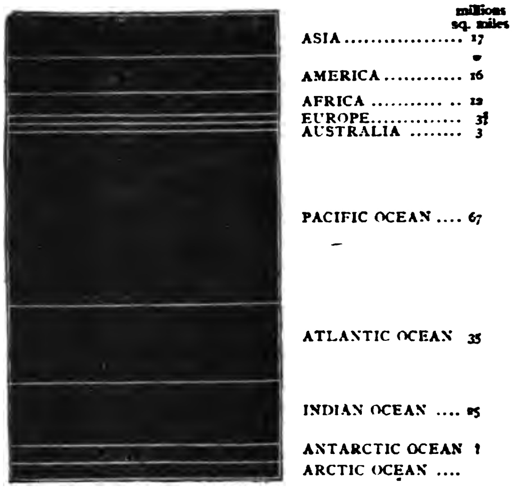


Fig. 3. A view of the relative areas of Land and Water.

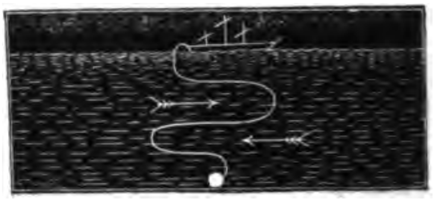


Fig. 4. Old mode of sounding, showing how error arises on account of currents.

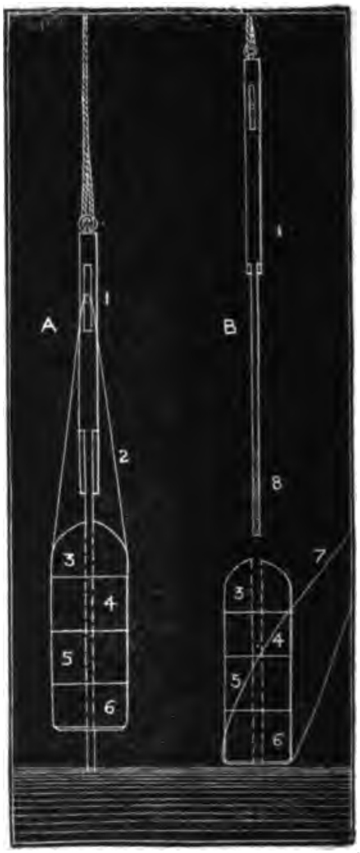


Fig. 5. A. Sounding apparatus entering the mud.
B. Apparatus being drawn up and leaving the sinkers, 4, 5, and 6, behind.
In the tube at 8 the specimens from the bed of the oc[illegible] are held.

BLACKBOARD NOTES.

1. England is the centre of the Land Hemisphere.
   This hemisphere contains 44,000,000 square miles of land.
2. New Zealand is the centre of the Water Hemisphere.
   This hemisphere contains 90,500,000 square miles of water.
3. The chief oceans are:—
   The Pacific with 67,000,000 square miles.
   The Atlantic with 35,000,000 „ „
   The Indian with 25,000,000 „ „
4. The old method of sounding by rope and lead is replaced for great depths by Lieutenant Brooke's apparatus.
5. In this apparatus—
   (*a*) Heavy weights sink the line (wire) and prevent currents carrying it away.
   (*b*) The weights are left upon the sea floor, and the tube is then easily raised.
   (*c*) A hollow tube collects the mud and conveys it for examination to the surface.

Tests in Mental Arithmetic.

STANDARD I.

1. From five fives take four fours. 9.
2. If there are 6 rows and 8 boys in a row, how many short of half a hundred are there? 2.
3. How many times can I spend a halfpenny out of 9d.? 18.
4. What would 12 balls cost at 3d. each? 3s.
5. If one boy has saved 3s., and another boy twice as much, how much have they together? 9s.
6. How much more would make a sovereign? 11s.
7. Annie had 6d., and spent 2½d.; how much had she left? 3½d.
8. How many farthings are equal to that? 14.
9. Add 7, 6, 5, 4, and take half. 11.
10. Take 10¾d. from a shilling. 1¼d.
11. I have half-a-crown, and spend half of it; how much have I left? 1s. 3d.
12. How many fivepenny books could be bought with that amount? 3.

STANDARD II.

1. Find the cost of 27 farthing tops. 6¾d.
2. What change would be received out of a shilling? 5¼d.
3. Harry saved 7½d. and Thomas 4½d. William saved three times as much as the two together; how much did he save? 3s.
4. Divide 3s. among four boys; how many pence pence is that for each boy? 9d.
5. Divide 9d. among four boys; how much would each boy receive? 2¼d.
6. How many pence are there in a crown and a shilling? 72d.
7. How many dozen are there in 72? 6.
8. What would 6 oranges cost at 9d. a dozen? 4½d.
9. How many boys could get a farthing each out of that sum? 18.
10. How many halfpenny oranges could you get for 1s. 1½d.? 27.
11. How many more are required to make two score? 13.
12. What would two score oranges cost at 6d. a dozen? 1s. 8d.

STANDARD III.

1. How many must you add to a hundred to make 9 dozen? 8.
2. Take 1s. 8d. from half-a-crown. 10d.
3. Divide 10d. among 8 boys; how much is that for each boy? 1¼d.
4. If a boy earn 9s. a week, and another boy 6s. a week, how much would they both earn in a month? £3.
5. How many pieces of ribbon 2 inches long can be cut from a yard? 18.
6. What would a yard of ribbon cost at a farthing an inch? 9d.
7. From a crown take the sum of 2s. 9d. and 1s. 10d. 5d.
8. How many lbs. of soap at 5d. a lb. can be bought for a florin and a penny? 5 lbs.
9. How many ounces would that be? 80 oz.
10. What is the cost of 3 dozen pears at 1½d. each? 4s. 6d.
11. Divide 4s. 6d. among 4 persons? how much would each receive? 1s. 1½d.
12. How many score are there in 6 dozen and 8? 4.

STANDARD IV.

1. What part of a shilling is 1½d.? $\frac{1}{8}$.
2. From ¾ of £1 take ⅔ of £1. 1s. 8d.
3. How much is ½ of ½ of a guinea? 5s. 3d.
4. What part of a ton is a quarter? $\frac{1}{80}$.
5. How many stone are equal to 3¾ cwt.? 30.
6. Find the cost of ¼ cwt. of tea at 4s. a lb. £5 12s.
7. What would 6 ounces of tea cost at the same price? 1s. 6d.
8. What part of 132 is a dozen? $\frac{1}{11}$.
9. If a boy save a penny a day, what would he have saved in 1888? £1 10s. 6d.

10. If a boy save 2d. a day during February in 1888 and 1889, how much would he save? 9s. 6d.
11. What part of a mile is a pole? $\frac{1}{320}$.
12. If 9 horses cost £177, what would 3 horses cost? £59.

STANDARD V.

1. How many ounces are there in $\frac{3}{4}$ stone? 168.
2. Find the cost of $2\frac{1}{2}$ stone of flour at $1\frac{1}{2}$d. per lb. 4s. $4\frac{1}{2}$d.
3. If you can get $\frac{1}{4}$ lb. tea for 9d., how many lbs. could you get for half a guinea? $3\frac{1}{2}$ lbs.
4. If three boys earn 17s. 6d., what will four boys earn? £1 3s. 4d.
5. What is the G. C. M. of 10 and 25? 5.
6. What is the L. C. M. of 10 and 25? 50.
7. Add $\frac{1}{20}$ and $\frac{1}{30}$. $\frac{1}{12}$.
8. How many times can you take $\frac{1}{12}$ from $\frac{1}{3}$? 4.
9. What is the difference between $\frac{1}{20}$ and $\frac{1}{30}$? $\frac{1}{60}$.
10. How much is $\frac{1}{3}$ of $\frac{1}{4}$ of $\frac{1}{5}$ of £1? 4d.
11. What fraction of a florin is that amount? $\frac{1}{6}$.
12. Find the interest on £650 for half a year at 6 per cent. £19 10s.

STANDARDS VI. AND VII.

1. If I change 7 to 9 in the fraction $\frac{2}{7}$, what difference is made? $\frac{4}{63}$.
2. Bring ·08 to a vulgar fraction. $\frac{2}{25}$.
3. Multiply 2·02 by 100. 202.
4. Divide 2·02 by 100. ·0202.
5. What fraction of half-a-crown is 2s. 1d.? $\frac{5}{6}$.
6. What is the square of 18? 324.
7. How many times is the average of 4, 5, 6, contained in the average of 9, 10, 11? 2.
8. What fraction of £144 is the interest on £300 for 3 years at 4 per cent.? $\frac{1}{4}$.
9. At what rate per cent. would £79 12s. 6d. double itself in 25 years, simple interest? 4 per cent.
10. I bought a watch for £6, and sold it for £4; what did I lose per cent.? $33\frac{1}{3}$ per cent.
11. What is the amount of 20 guineas for $3\frac{1}{2}$ years at $2\frac{1}{2}$ per cent.? £22 16s. 9d.
12. If an article be sold for £12 at a loss of 4 per cent., what is the prime cost? £12 10s.

Query Column.

RULES.

1. Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

⁂ All communications for this column should be addressed—'*The Query Editor,*' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.*

General.

1. LUNE.—The numerical working of your query would take up too much room for a question of so little general interest. The result can be obtained by Trigonometry, taking the area of the Lune as the sum of the areas of the segments of the two circles. If angle HTR = θ, then angle HCT (C being the centre of the first circle) = $180° - 2\theta$.

2. TOM.—We shall be pleased to answer your queries if you will write them clearly and correctly. The first one is perfectly unintelligible. In the second one NC appears nearly at the end and has previously not been mentioned. Is it meant for AC? Please repeat your queries.

3. A. H. M.—We are not aware that the change has already taken place yet, and could not therefore promise to supply the questions set. There is no harm in your writing as you propose. Your main guide will be the syllabus. Formerly two solutions were given, containing not more than two acids and two bases, either organic or inorganic.

4. MAGISTER.—Only students and acting teachers can sit, and you are neither. If you are in doubt write to the secretary of the department and ask, or write to the Inspector of the school in which you served.

5. MERTHYR TYDVIL.—Most probably.

6. VOLUNTEER.—Write to the War Office. You will get the information you require.

7. J. J. PATERSON.—Huxley's Physiography. You cannot have a better companion to the one you name.

8. H. M.—Arrangements have been made for publishing the parts named, with all necessary explanations, in this magazine in good time.

9. ANXIOUS ONE.—There is only one for the country. Any good manual will do. Have you seen Jones'? Try it.

10. H. W. L. R.—Give the kind of geography you want. For Euclid and algebra Hall & Knight's will suit you.

11. LINNÆUS.—Candidates are selected. Mere application will not be enough. You have good qualifications. Write to the department and state them. You are a science teacher, and, so far as we can judge, the sort of student likely to be selected.

12. CONSTANT READER.—No, it does not. If you obtain a sufficient number of marks in the other subjects you will pass, notwithstanding the mishap you name.

13. AN ANXIOUS ONE.—You can be examined in a subject in which you have not attended any class, but you must go to a place for examination which the department fix upon. That might be a long way. Write to the Secretary, Science and Art Department, S.W.

14. W. H.—'Golden Treasury of Songs and Lyrics' is published by Macmillan, 4s. 6d. Trench 'On the Study of Words' is published by Macmillan, 5s. There are several editions of Lock's 'Thoughts.' Daniell's is good. The sections required will be published in this journal. 'Macbeth,' Clarendon Press edition. See also the '*Practical Teacher.*' Bacon's 'Essays,' several editions. Storr's and Abbott's are excellent; other and cheaper ones would do.

15. SELSEY BILL.—(1) Yes, read both. H. M. I. will choose, not you. If you take a, b, c, d, you cannot take Economy. (3) No. (4) Gray's Odes and Elegy, Bradshaw's, Macmillan. Repeat questions on the other two.

Mensuration.

1. SCRIBE.—A man had two daughters; to one he gave a round piece of land, to the other a square piece. Each was valued at £20 per acre, and the shillings that did encompass each paid for it. If the diameter of a shilling be one inch, how much does the square exceed the circle?

$$\text{Area of circle} = \tfrac{1}{2}\text{ circumference} \times \tfrac{1}{2}\text{ diameter}$$
$$= \tfrac{1}{2}\text{ circumference} \times \tfrac{1}{2}\text{ of } \tfrac{7}{22}\text{ of cirf.}$$
$$= \tfrac{7}{88}\text{ of circumference}^2;$$

Value of circular piece of land

$$= [(\text{Circumference in yards})^2 \times \tfrac{7}{88} \times \tfrac{20}{4840}]£;$$

$$\therefore (\text{circumference in yards})^2 \times \tfrac{7}{88} \times \frac{\overset{10}{\cancel{40}}}{\underset{121}{\cancel{484}}}$$

$$= \text{Circumference in yards} \times 36,$$

$$\text{Circumference in yards} \times \frac{70}{88 \times 121} = 36,$$

$$\therefore \text{Circumference} = \frac{36 \times 88 \times 121}{70}\text{ yards.}$$

Area of circular piece of land

$$= \tfrac{7}{88}\text{ of } \left(\frac{36 \times 88 \times 121}{70}\text{ yards}\right)^2$$

$$= \frac{\cancel{7} \times 36 \times \cancel{88} \times 121 \times \overset{9}{\cancel{36}} \times 88 \times \cancel{121}}{\cancel{88} \times \underset{10}{\cancel{70}} \times 70 \times \underset{\underset{10}{\cancel{40}}}{\cancel{4840}}}\text{ acres}$$

$$= \frac{3449952}{7000}\text{ acres}$$

$$= 492\tfrac{5952}{7000}\text{ acres.}$$

Value of square piece of land

$$= [(\text{side in yards})^2 \times \tfrac{20}{4840}]£;$$

$$\therefore (\text{side in yards})^2 \times \tfrac{40}{484} = \text{side in yards} \times 36 \times 4,$$

$$\text{side in yards} \times \tfrac{10}{121} = 144,$$

$$\therefore \text{Side} = \frac{144 \times 121}{10}\text{ yards.}$$

Area of square piece of land

$$= \left(\frac{144 \times 121}{10}\text{ yards}\right)^2$$

$$= \frac{144 \times 121 \times \overset{36}{\cancel{144}} \times \cancel{121}}{10 \times 10 \times \underset{\underset{10}{\cancel{40}}}{\cancel{4840}}}\text{ acres}$$

$$= \tfrac{627264}{1000}\text{ acres}$$

$$= 627\tfrac{264}{1000}\text{ acres.}$$

$$\therefore \text{Difference} = (627\tfrac{264}{1000} - 492\tfrac{5952}{7000})\text{ acres}$$

$$= 134\tfrac{2896}{7000}\text{ acres.}$$

$$= \underline{134\tfrac{362}{875}\text{ acres.}}\quad\text{Ans.}$$

Algebra.

1. J. S. L.—If $a + b + c = 3s$, show that

$$(s-a)^4 + (s-b)^4 + (s-c)^4$$
$$= 2[(s-b)^2(s-c)^2 + (s-a)^2(s-c)^2 + (s-a)^2(s-b)^2]$$

If $a + b + c = 3s$,

Then $(s-a) + (s-b) + (s-c) = 0$;

Put x, y, and z for $(s-a)$, $(s-b)$, $(s-c)$ respectively.

$$x + y + z = 0$$
$$x + y = -z$$

Squaring] $x^2 + y^2 + 2xy = z^2$

$$x^2 + y^2 - z^2 = -2xy$$

Squaring] $x^4 + y^4 + z^4 + 2x^2y^2 - 2x^2z^2 - 2y^2z^2 = 4x^2y^2$

$$\therefore x^4 + y^4 + z^4 = 2y^2z^2 + 2x^2z^2 + 2x^2y^2;$$

Substituting the values for x, y, z, we have

$$(s-a)^4 + (s-b)^4 + (s-c)^4$$
$$= 2[(s-a)^2(s-c)^2 + (s-a)^2(s-c)^2 + (s-a)^2(s-b)^2].$$

2. OLD MAN OF CARMEL.—Solve:—

$$\left.\begin{aligned} x + y + z &= d \\ ax + by + cz &= d^2 \\ a^2x + b^2y + c^2z &= d^3 \end{aligned}\right\}\ (\textit{Easton's}\text{ ‘Factors.’})$$

$$\left.\begin{aligned} (1)\quad x + y + z &= d \\ (2)\quad ax + by + cz &= d^2 \\ (3)\quad a^2x + b^2y + c^2z &= d^3 \end{aligned}\right\}$$

$$\left.\begin{aligned} (1)\ cx + cy + cz &= cd \\ (2)\ ax + by + cz &= d^2 \end{aligned}\right\}$$

$$(a-c)x + (b-c)y = d^2 - cd$$
$$= d(d-c). \quad (4)$$

$$\left.\begin{aligned} (1)\ c^2x + c^2y + c^2z &= c^2d \\ (2)\ a^2x + b^2y + c^2z &= d^3 \end{aligned}\right\}$$

$$(a^2-c^2)x + (b^2-c^2)y = d^3 - c^2d$$
$$= d(d^2-c^2). \quad (5)$$

$$\left.\begin{aligned} (4)\ (a-c)(b+c)x + (b^2-c^2)y &= d(b+c)(d-c) \\ (5)\ (a^2-c^2)x + (b^2-c^2)y &= d(d^2-c^2) \end{aligned}\right\}$$

$$[(a^2-c^2) - (a-c)(b+c)]x = d[(d^2-c^2) - (b+c)(d-c)]$$

$$(a^2 - c^2 - ab - ac + bc + c^2)x$$
$$= d(d^2 - c^2 - bd + bc - cd + c^2)$$

$$(a^2 - ab - ac + bc)x = d(d^2 - bd + bc - cd)$$

$$[a(a-b) - c(a-b)]x = d[d(d-b) - c(d-b)]$$

$$(a-b)(a-c)x = d(d-b)(d-c)$$

$$\therefore x = \frac{d(d-b)(d-c)}{(a-b)(a-c)}.$$

$$(4)\ (a-c)x + (b-c)y = d(d-c)$$

$$(b-c)y = d(d-c) - \frac{d(d-b)(d-c)}{a-b}$$

$$= \frac{d(d-c)[(a-b)-(d-b)]}{a-b}$$

$$\therefore y = \frac{d(d-c)(a-d)}{(a-b)(b-c)}.$$

$$\left.\begin{aligned} (1)\ bx + by + bz &= bd \\ (2)\ ax + by + cz &= d^2 \end{aligned}\right\}$$

$$(a-b)x + (c-b)z = d(d-b)$$

$$(c-b)z = d(d-b) - \frac{d(d-b)(d-c)}{a-c}$$

$$= \frac{d(d-b)[(a-c)-(d-c)]}{a-c}$$

$$\therefore z = \frac{d(d-b)(a-d)}{(a-c)(c-b)}$$

$$\text{or } \frac{d(d-b)(d-a)}{(a-c)(b-c)}.$$

Note.—No marks are given for Mathematics. The subjects are:—Mechanics; Chemistry; Animal Physiology; Acoustics, Light, and Heat; Magnetism and Electricity; Physiography; Botany; Principles of Agriculture.

Arithmetic.

1. JUVENIS.—Determine the heaviest unit for which ·0064 ounces will be represented by an integer. (*Barnard Smith.*)

·0064 oz. = ·128 dwt.

= 3·072 grs. = $\tfrac{3072}{1000}$ grs.

= $\tfrac{384}{125}$ grs.;

∴ Heaviest unit = $\tfrac{1}{125}$ gr.

= ·008 gr. Ans.

2. APOLLONIUS.—The metre being 1·0936 yards in length, find a series of integral numbers of metres, which are nearly equal to integral numbers of yards. (*Elsee's* ‘Arithmetic.’)

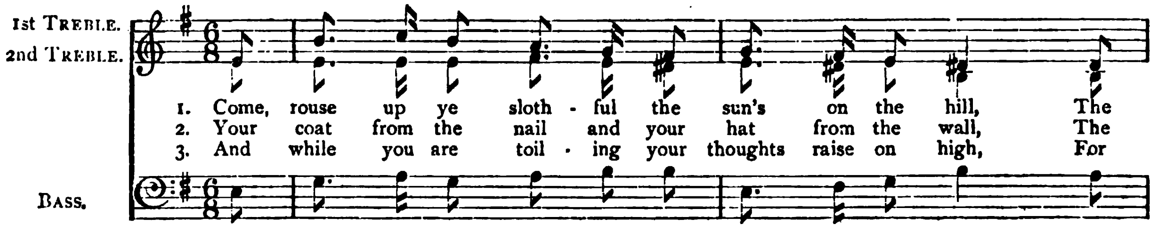
10 metres = 10·936 yds. = 11 yds. nearly;
11 „ = 12·0296 „ = 12 „ ;
21 „ = 22·9656 „ = 23 „ ;
22 „ = 24·0592 „ = 24 „ ;
31 „ = 33·9016 „ = 34 „ ;
32 „ = 34·9952 „ = 35 „ ;
&c., &c.

The nearest to integral numbers of yards are therefore:—

10, 11, 21, 32 metres, &c.

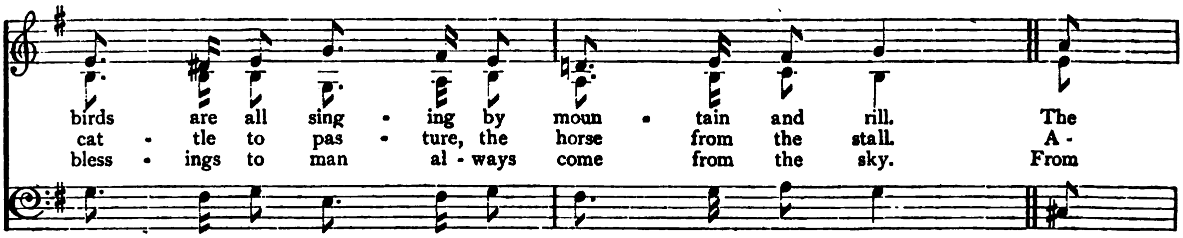
COME, ROUSE UP YE SLOTHFUL.

Tune:—'*Derry Down,*' or '*A Cobbler there was.*'

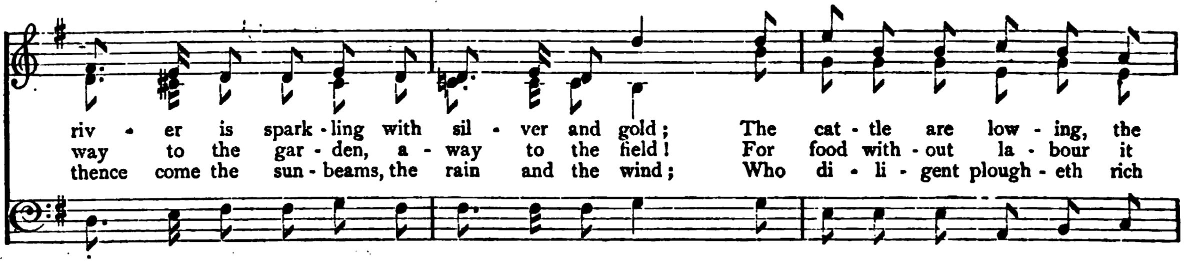

1st Treble.
2nd Treble.
Bass.
1. Come, rouse up ye sloth - ful the sun's on the hill, The
2. Your coat from the nail and your hat from the wall, The
3. And while you are toil - ing your thoughts raise on high, For

KEY G. *Lah Mode.*

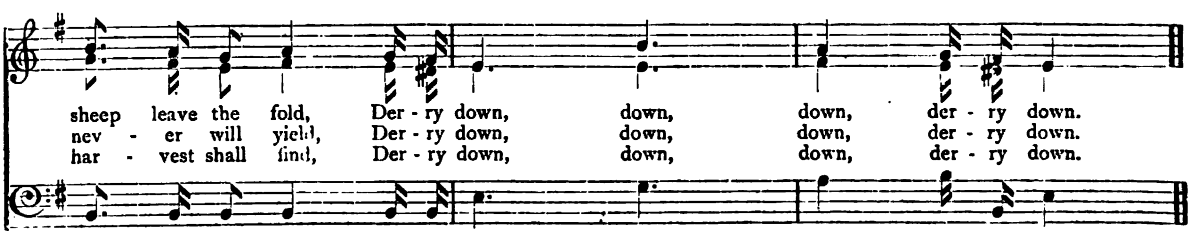
1st Treble. { : l, | m :- . f : m | r :- . d : t, | d :- . t : l, | se, :— : se, }
2nd Treble. { : l, | l, :- . l, : l, | t, :- . l, : se, | l, :- . se, : l, | m, :— : m, }
Bass. { : l, | d :- . r : d | r : m : m | l, :- . t, : d | m :— : r }


birds are all sing - ing by moun - tain and rill. The
cat - tle to pas - ture, the horse from the stall. A -
bless - ings to man al - ways come from the sky. From

{ | l, :- . se, : l, | d :- . t, : l, | s, :- . l, : t, | d : — ‖ r }
{ | m, :- . m, : m, | d, :- . r, : m, | r, :- . m, : f, | m, : — ‖ l, }
{ | d :- . t, : d | l, :- . t, : d | t, :- . d : r | d : — ‖ bah, }


riv - er is spark - ling with sil - ver and gold; The cat - tle are low - ing, the
way to the gar - den, a - way to the field! For food with - out la - bour it
thence come the sun - beams, the rain and the wind; Who di - li - gent plough - eth rich

{ | t, :- . l, : s, | s, : l, : s, | s, :- . l, : s, | s :— : s | l : m : m | f : m : r }
{ | s, :- . bah, : s, | s, : bah, : s, | f, :- . f, : f, | m, :— : m | d : d : d | l, : d : l, }
{ | s, :- . l, : t, | t, : d : t, | t, :- . t, : t, | d :— : d | l, : l, : l, | r, : m, : f, }


sheep leave the fold, Der - ry down, down, down, der - ry down.
nev - er will yield, Der - ry down, down, down, der - ry down.
har - vest shall find, Der - ry down, down, down, der - ry down.

{ | m :- . r : d | r :— : d . t, | l, :— :— | m :— :— | r :— : d . t, | l, :— : ‖ }
{ | d :- . t, : l, | t, :— : l, . se, | l, :— :— | l, :— :— | t, :— : l, . se, | l, :— : ‖ }
{ | m, :- . m, : m, | m, :— : m, . m, | l, :— :— | d :— :— | r :— : m . m, | l, :— : ‖ }

How a Scotch School was Examined.

ON entering the room the Inspector asked for a list of songs. Out of eight he chose one, and after that other two of the teacher's choosing were given.

Modulator Exercise:—**d m t d' l f r l**$_1$ **t s fe 'd t r f m l**$_1$ **t**$_1$ **r** ^{d}**s fe m d.** **l**$_1$ **t**$_1$ **d r m ba se l s f m r d t**$_1$ **l**$_1$ **d** &c.

A test piece in two parts was written on blackboard.

Ear Exercise on Harmonium:—**m l s d; r f t**$_1$ **d; d' l se l; r m f d; s fe l s**—These for the higher Standards. **d r m; m f s; l s f**, &c., for the lower Standards.

For a voluntary **d** and **m**, **r** and **f**, **s** and **t** were sounded together and several children could tell the two notes. One little fellow distinguished **r** and high **t** played together.

After finishing this part of the examination the Inspector went to the Infant Department. During his absence the Standards were arranged for the written examination.

INFANTS.

Song.—This is the top of my little head, &c. (action).

Modulator:—**d s m d' m d s d' t l s m r f l**, &c.

Object Lesson.—The Ostrich.

Reading.—3rd Class: Blackie's Primer, Part I. Each child read a line and spelt such easy words as dog, man, &c.

Writing.—Small letters s t u; figures 2, 3, 4.

Arithmetic.—2 and 3? 5 and 3? 4 and 5? 2 from 6? 4 from 7? 5 from 8? How many legs have two cows got? I had 6 cows and sold 4, how many left?

Reading.—2nd Class: Collins's Infant Reader. Every second child read a sentence, and spelling was taken from lesson read.

Writing.—Each child made six different letters, three capital and three small, as—(1) Aa, Bb, Cc, (2) Dd, Ee, Ff, &c.

Arithmetic.—5 and 4? 6 and 5? 7 and 6? 4 from 9? 2 from 11? 4 from 10? How many legs have 3 cows? How many half-pennies make 3d. Had 12 marbles, lost 8; how many left?

Reading.—1st Class: Blackie's Primer, Part II. Only a few were asked to read. Spelling: such words as please, school, short.

The meaning of single words from the lesson read.

Writing.—Each child was asked to make three capital and three small letters; tested quite the same as the 2nd Class.

Arithmetic.—The children in this class were questioned individually—8 + 9? 7 + 6? 13 + 7? 19 + 8? 16 — 7? 12 — 4? 17 — 8? 14 — 10? Got 20 marbles, lost 14; how many left? How many pennies in two shillings? How many 4's in 16, &c.

Sewing.—*A.* Hem 5 inches in one colour.

B. To knit 6 rows of 12 loops previously cast on.

STANDARD I.

Reading.—Chambers' Graduated and Star Readers. Half the class read from one book and half from the other. Spelling asked from every one, and questions given on the meaning of words and phrases.

Writing.—Transcribed a line from their own book.

Arithmetic.—(1) 989 + 777 + 685 + 739 + 845. 4035. Ans.

(2) 917 + 80 + 909 + 16 + 9. 1931. Ans.

(3) 987 — 96. 891. Ans.

Sewing.—*A.* To work in two colours (so as to show join) a hem of 5 inches.

B. To knit 12 rows of 12 loops, with chain edge and cast off.

C. To work a sew and fell seam of 5 inches.

STANDARD II.

Reading.—Chambers' Graduated and Star Readers. The boys read from the former and the girls from the latter. The Inspector was very particular, both in I. and II. Standards, to have the proper inflection and modulation of voice, in order to give the proper sound to the sense. The children professed to know verbs, nouns, and adjectives.

Writing.—Copy books shown.

Dictation.—'As the two knights came up to the statue from opposite ways, each saw but one side of the shield: one saw the iron . . .'

Arithmetic.—1. 9,060 + 17 + 8,490 + 4,009 + 6,785 + 494 + 7,060. 35,915. Ans.

2. 8,047 − 949. 7,098. Ans.

3. 8,549,367 × 6. 51,296,202. Ans.

After working these the slates were collected, and marked by the second master. Slates were thereafter piled according to passes in 3, 2, or 1 sum, and the Inspector glanced over all to satisfy himself.

Sewing.—*A.* To work a sew and fell seam of 5 inches in cotton of two colours, so as to show a join in both seam and fell.

B. To cast on 12 loops and knit 12 rows purl and plain, and afterwards cast off.

STANDARD III.

Reading.—Nelson's Star and Scottish Historical Readers. Boys read from the former, girls from the latter.

Grammar taken from reading lesson, and was not very difficult.

Writing.—Copy books looked.

Dictation.—'Suddenly a cry was heard—a cry of terror and dismay—for flames burst forth from the room in which the children slept! All hope seemed now gone. The mother gazed in despair upon the sight: she could not speak. Her grief was terrible to behold.'

Arithmetic.—Cards, one of which was (A.): 1. Multiply seven hundred and fourteen thousand and fourteen by seven thousand and fourteen.

5,008,094,196. Ans.

2. Divide 139,648,723 by 179.
780,160$\frac{83}{179}$. Ans.

3. Find the 37th part of five hundred thousand four hundred. 13,524$\frac{12}{37}$. Ans.

4. Add £86 5s. 6d., £600 16s. 8¾d., £91 7s. 4¼d., £105 10s. 9¾d. £884 0s. 4¾d. Ans.

History.—A pupil teacher examined the class on the 'Life of Queen Mary.'

Geography.—The Inspector tested them on the general features of Scotland, and wound up with some questions about the principal seats of trade, and the towns situated in them.

Repetition.—'The Beggar Man.' Some of the boys suited the action to the word, which pleased very well.

Sewing.—*A.* To fix for stitching and work not less than half of 5 inches, and sew on a string.

B. To cast on 30 loops and knit with 4 pins 10 rounds, breaking and joining the cotton once, and cast off.

C. To darn on canvas 20 rows 1½ inches long, and work 3 inches of herring-boning.

STANDARD IV.

Reading.—Nelson, Star, and Scottish Readers. The Star was the only book taken, and the reading was severely tested. Meanings were asked, and Grammar and Analysis taken from reading book.

Writing—Dictation.—'On the approach of the hunter it greets him with a loud yelp, and retires into its burrow, but only to put forth its head again to watch the stranger's movements. It changes the colour of its coat according to the season. In winter it is pure white, and cannot at a distance be distinguished from the snow among which it lies. In summer it is of a beautiful gray.'

Arithmetic.—One card is given as a sample.

1. Multiply £37 11s. 8½d by 370.
£13,906 12s. 1d. Ans.

2. Divide £8,963 17s. 8d. by 87.
£103 0s. 7¾d. $\frac{71}{87}$. Ans.

3. Multiply 3 acres 1 rood 17 poles by 307.
1,030a. 1r. 19p. Ans.

4. Reduce 2 cwt. 1 qr. 13 lbs. to ounces.
4,240 oz. Ans.

Repetition.—'Llewellyn and his Dog.' A verse asked from one here and there in the class. The Inspector gave the first two or three words, and the pupil finished the verse. Meanings of words and phrases as in Standard III.

History.—A list of the sovereigns of the period, with their families and consorts asked. Dates required, and a pretty minute examination on the Commonwealth was then taken.

Sewing.—*A.* Gather and stroke down 7 inches and fix into a band 3 inches, and set in 1½ inches.

B. To put in a flannel patch about 2 inches square.

C. To mark on canvas the letters J. L., and darn a hole in stocking material.

STANDARD V.

Reading.—Star Reader No. 6 and Historical Reader No. 5.

They read only from No. 6, and, as before, the reading was severely tested. The Grammar and Analysis were not very difficult. Questions were asked on the structure of complex sentences. What was a principal sentence? What a subordinate? Give an example.

Repitition.—This was taken with Standard VI., and consisted of an extract from 'The Merchant of Venice.' The Inspector was very particular as to the style of repeating the passage, and the pupils were required to speak to their neighbours when the part suited. Not many questions were asked either for meaning of words or phrases; but the teacher was asked to give them a lesson on prefixes, affixes, and the composition of words.

Writing.—The following story was read twice, once by the teacher and a second time by the Inspector:—'A jewel merchant, on arriving in Paris, was asked by an officer of police, who met him at the railway station, to accompany him to the presence of the chief director of police. He was received with great politeness, and to his surprise found that not only did the chief know his position, but that he had accurate information about the kind and amount of some valuable jewels he carried in his bag.

'The chief then said to him, "Sir, you are to be robbed and murdered to-night. You must not fall asleep, but keep awake till half-past twelve, at which hour the attempt will be made. Don't search your room before retiring, or excite your servant's curiosity, but leave everything to me."

'The merchant followed these directions and found everything happen as he had been informed. At half-past twelve three men—one of them his own servant—entered the room. After rifling the bag, they began to settle how they would kill him. Just then the chief with a number of police burst into the room, secured the thieves, and took them off to prison.'

Arithmetic.—One card was as follows:—

1. Find by practice the value of 862 articles at £5 16s. 10¼d. each. £5,036 8s. 3½d. Ans.

2. Make out in proper form this bill:—
15½ lbs. of coffee, at 1s. 8d. per lb.
7 boxes biscuits, at 1s. 10½d. each.
17 lbs. raisins, at 2s. 5d. per lb.
30 lbs. tea, at 2s. 8d. per lb.
£1 5s. 10d. + 13s. 1½d. + £2 1s. 1d. + £4.
= £8 0s. 0½d. Ans.

3. If the carriage of 1 ton 1 qr. for 150 miles be £3 9s. 4d. what weight would be carried the same distance for 8s. 8d.? 10 qrs. 3 lbs. 8 oz. Ans.

4. Add together $\frac{1}{2}$, $\frac{1}{3}$, $\frac{3}{4}$, and divide the result by 3.
$\frac{19}{36}$. Ans.

History.—The teacher examined the class on the reign of George I.

Geography.—Europe was taken pretty minutely, and then some questions were given on Australia.

Sewing.—*A.* To cut out and tack together the pattern of a child's pinafore; also cut and work a button hole.

B. To darn a hole in stocking material and mark on coarse linen the letter J.

Standard VI.

Reading.—Star Reader No. 6, and Scottish Historical Reader.

They read parts of three lessons. When analysing, he called upon one to count the number of sentences in a passage, and say what kind of a sentence they formed, complex or compound, and why.

Repetition as in Standard V., which see.

Writing.—Essay on 'A Holiday Excursion.'

Arithmetic.—One card as follows:—

1. If 7 men mow 37 acres in 3 days of 8 hours each, how many men will mow a field twice the size, working 4 hours longer in 7 days? 4 men. Ans.

2. Simplify $3\frac{1}{6}$ of $\frac{8}{57} + \dfrac{6\frac{1}{6} - 5\frac{4}{5}}{6\frac{1}{6} + 5\frac{1}{5}}$ $\frac{133}{279}$. Ans.

3. Reduce to vulgar fractions $\cdot 2\dot{7}$, $1\cdot 0\dot{6}$, $\cdot 00\dot{2}\dot{1}$, $\cdot 5\dot{9}\dot{0}$.
$\frac{5}{18}$, $1\frac{1}{15}$, $\frac{7}{3330}$, $\frac{13}{22}$. Ans.

4. Find the simple interest on £434 16s. 8d. for $4\frac{1}{2}$ years at 5 per cent. per annum. £97 16s. 9d. Ans.

History.—Reign of Queen Victoria, with a list of Prime Ministers.

Geography.—Questions on Australia and New Zealand.

Maps of India, Australia and South America.

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music.

Division III.—Standards III. and IV.

Code Requirement.

Song Test.

To sing in unison, in good time and tune and with due expression, a school song (set to words). Five songs to be prepared. Rounds or two-part songs may be offered in place of unison songs.

118. Sections 70 to 80 in the numbers for August and September dealt with modes of teaching songs to Division II. In Division III. a better class of school songs and a better quality of voice and intelligent expression will naturally be looked for. Part singing should be commenced, although it is not required at the examination.

119. It should be observed that the requirements still ask for *school* songs. The five selected should not be all in one style. A little thought will enable a teacher to choose songs that differ in key, measure, rhythm, or general expression. Choose at least two that depend for effect upon sweet tone and sympathetic expression rather than upon dash and march-like rhythms. The songs chosen can be sung from book or from memory. If part singing is attempted it is unwise for altos to do entirely without the book, because errors gradually creep in that are very difficult to stamp out.

120. It is sometimes complained, and very justly, that the school music practised in elementary schools has only an ephemeral utility and it is suggested that classical music should be learnt, because of its value in after life. A writer in the Blue Book, 1887—1888 (p. 361), advocates the use of 'modern ballads, standard music, and the treble part of well-known glees.' It would certainly be a great gain for music if children could be taught in school to admire and enjoy glees and other standard music, but can one in fifty of our schools attempt such music with a chance of success? It is enough to point out that the words of most modern ballads are quite unsuited to children, and that a well played pianoforte accompaniment is generally an indispensable part of the effect; that the treble parts of most glees are not interesting in themselves, and that if the other parts are to be played an instrument and a good player must be provided. Moreover, the compass of the treble parts of glees is mostly too high for children, certainly for those children with alto voices; and in the case of boys, whose voices will, of course, settle into tenor or bass, the future utility of the treble part is out of the question. In face of these obstacles most teachers must perforce be content to choose music specially adapted for their resources.

121. Part singing in some form should be attempted in this Division as soon as possible. The longer only unison singing is practised the more difficult it will be to get good part singing. The teacher has at the outset two objects to look after. He has to find out the pupils with low voices or those with high voices, and he has to devise means of practice whereby his low voices can learn to hold an alto part against a treble part.

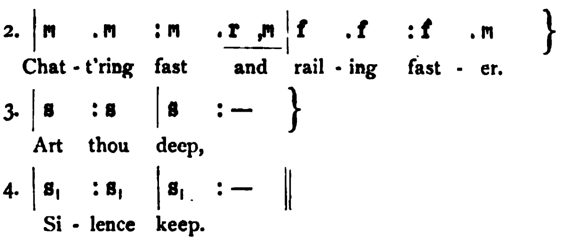
122. The practice of rounds affords the best means of sorting a class into trebles and altos and of accustoming pupils to part singing.

Plan for Dividing a Class for Part Singing.

Thoroughly teach the melody of a simple round that has a range of not more than an octave. The following is a suitable specimen:—

Uncurbed Tongues.

Doh is F. Round in four parts.


1. | d .d :d .t, ,d | r .r :r .d
Un - curbed ton - gues out-run their mas - ter.
2. | m .m :m .r ,m | f .f :f .m
Chat - t'ring fast and rail - ing fast - er.
3. | s :s | s :—
Art thou deep,
4. | s, :s, | s, :— ||
Si - lence keep.

When this can be sung fluently in unison the teacher should (1) sing a part against all the class, (2) sing against each half of the class in turn, (3) make each half of the class sing against the other, (4) join in to make a third part, (5) divide the class into three parts and let each enter in turn, (6) sing a fourth part against the three, (7) divide the class into four parts. When the class has succeeded in keeping the four parts going the time has arrived for examination of voices and holding power. The teacher should go amongst the pupils and notice those who sing the low notes firmly and steadily and with a good body of tone. This experiment can be repeated again and again, until a good number of altos have been identified. When these are seated together (on the right of the teacher) the two groups should be practised separately with modulator and other tune exercises. It will be found, of course, that there are still remaining on the left the pupils possessing low voices but unable to keep low notes against a higher part. As these are discovered they should be placed on the extreme right, so as to have the best altos wedged between them and the treble. They will probably soon run with the stream of alto in their neighbourhood. All the pupils on the left should not be assumed to be trebles because they are not altos. A watchful teacher will discover some who have but little voice and who strain painfully for any notes higher than about C^1. All such should be brought to the front and told either not to sing at all or else made to leave out high notes.

123. It may be said that the process of sorting described is unnecessarily elaborate and that there is no time for such care to be given. Many teachers adopt readier and rougher ways of classifying, 'to save time.' But it cannot be said too plainly that it would be better to have no singing at all than to go on inflicting upon uncomplaining children the pain and irremediable injury often caused by an unnatural use of the voice. How to treat children's voices is really a more important matter than how to teach them to sing note and other tests.

124. A simple two-part song, in which the two parts move together in rhythm, should now be selected for study. The altos should be taught their part first. After the trebles have got hold of their part all the altos and a few of the trebles should sing the two parts, more trebles being added as the altos show confidence and ease. If the alto part once gets thoroughly established it is a comparatively easy matter to keep it going. New comers soon fall into the way.

DIVISION IV.—STANDARD V. AND UPWARDS.

125. The children in this Division are expected to study tune passages containing changes of key indicated by bridge notes, and passages in the minor key or mode, pulse and half notes, quick six pulse measure, ear exercises of four tones, and to prepare two-part music.

CODE REQUIREMENT.

Tune.

Note Test. (*Written or printed.*)—1. To Sol-fa slowly, any simple diatonic prssage in the major key; also a similar simple passage containing a transition of one remove indicated by bridge notes.

Examples :—

Doh is D. A.t. f.D.
(1) **d m s f m r d s** ^{s}d t_1 **d m r** t_1 ^{d}s **f m s l t** d^1 ||

Doh is E♭. f.A♭.
(2) **d s m f r d m s** d^1 $^{d^1}s$ **f m r f m r** }
E♭.f.
^{m}l **t** d^1 **s m d m r l s** t_1 **d** ||

Also, to Sol-fa a short passage in the minor key or mode, introducing **se** used thus—**l se l** but without introducing **fah**, **ba**, or **soh**.

Doh is C. Lah is A.

Example :—
l t d^1 **t l se l t** d^1 **l** r^1 d^1 **t l** d^1 **t l se l** ||

126. The side columns, the first to the right and the first to the left on the modulator, must now have close attention. An elaborate demonstration of what happens when a key is changed is quite unnecessary at first. The points to make clear from time to time are: that **doh** is called the key-tone of the scale; that when the sound of the **fah soh**, or of any other tone of the scale we start in, is adopted as a new **doh**, the key is said to be changed; that when **soh** becomes **doh** the new te_1 is the same as **fe** and that when **fah** becomes **doh** the new **fah** is the same as **ta**; that the change may be made upon any tone of the scale that has a tone level with it in the side column, and that the tone on which the change is made is called the *bridge note*. The fact that when the pointer moves from column to column one tone becomes another without altering its pitch is the supreme fact for the pupil to understand.

127. It is best to commence with changes, or *transitions* as they are termed, to the right hand column. A few phrases patterned by the teacher will soon enable the class to grasp the nature of their task. Thus the teacher may point and sing, say:

d^1	f
t	m
l	r
s	d
fe	t_1
f	
m	l_1
r	s_1
d	f_1

Changes to right hand column.

1. **d m d s s** ^{s}d t_1 **d**
2. **s m d m** $^{m}l_1$ t_1 **d**
3. **d r m r** $^{r}s_1$ t_1 **d**
4. **m s d s l** ^{l}r **d** t_1 **d**
5. **s m d d** $^{d}f_1$ s_1 l_1 t_1 **d**

the pupils singing each phrase after the teacher and then again through them all without the pattern.

(To be continued.)

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,

Ex-President of the N.U.E.T.

X.

A class of subjects which is often represented in the composition exercises set in examination papers, and for which the candidate should, therefore, be prepared, may be described as coming under the category of social questions. If one of these is chosen it is usually one that has just come into prominent notice through the ordinary means of public discussion, or the circumstances of the time.

The best preparation for dealing with such questions is no doubt to be found in listening to good debates on them, and, if possible, taking part in such debates. Next to this comes the reading of such summaries of public discussions as appear in the leading articles of the best newspapers or in essays contributed to monthly and other reviews.

We propose to take for our specimen essay of this type, the subject of 'Poverty in Great Cities.' Treating of this as a generally recognised evil of our time, we may take the following outline notes as our basis:—

Poverty in large cities a difficult and pressing problem. Its symptoms—Appearance of people. Statistics of pauperism. Cases of distress and starvation. Causes—Crowding of country population to towns. Want of suitable training. Excessive competition in trade and manufactures. Sweating. Idleness and other defects of personal character. Consequences—Over-crowded dwellings, dirt, disease, deterioration of race, excessive mortality, intemperance and crime. Remedies—Poor law administration, emigration, private benevolence, more rational system of education, improved land system.

We have given this outline as an example of the form in which the student may with advantage lay down the plan of his work. We would, however, again remind him that he should regard such an outline as a guide to help him, and not as an authority from which no deviation is permissible.

POVERTY IN GREAT CITIES.

There is scarcely any problem connected with social life in the present day, which is more generally recognised as urgent and difficult of solution than that presented by the poverty in our great cities.

The signs of this serious evil are but too evident to all observant people. It forces itself upon our attention in the crowds of wretched-looking, ill-clad persons who may be seen in many quarters of any large city, especially in the pale wizened faces of ragged, dirty, and neglected children that issue from the slums. Statistics of pauperism show us that in London alone as many as one hundred thousand persons per week are in receipt of parish relief, and this gives us an inadequate idea of the extent of the poverty; for many will endure the greatest hardship before they will submit themselves to what they consider the disgrace of receiving such help; and many more are prevented from needing it only by the kind interposition of charitable friends and the benefits of charitable institutions. In spite of the operation of the poor law, of private charity, and organised philanthropy, our feelings are often shocked by narratives of the deepest distress, and even of deaths from starvation.

Thoughtful people cannot become acquainted with the facts about the existence and extent of this poverty without having their attention directed to its causes and consequences, nor without some kindling of desire for the discovery of such remedies as may be possible. The conclusion to which most students of the problem are driven, is that any remedy to be of permanent value must deal with the causes rather than with the consequences. The root of the evil must be struck at rather than the branches.

One of the chief causes of the evil, undoubtedly, is that the populations of our large towns are abnormally increased by immigration from the country districts. Many labourers earning small wages in the country are tempted to leave their homes for the town by the hope of better wages and brighter prospects, only to be disappointed when they find that the greater demands on their earnings, and the less favourable conditions for a healthy life, make their position worse than it was before.

Another circumstance which is partly responsible for the poverty of many people, is their lack of technical and industrial training. Children leave school at an early age, and, tempted by the prospect of what is for them a considerable weekly wage, enter upon duties that require no special training. Thus they are not prepared for any permanent trade; and when they become a little older, they have to make way for successors of the same type, while in too many cases they are compelled to join the ranks of the unemployed. The decay of the apprenticeship system, and the widely extended use of machinery, have probably much to do with this result. The increased keenness of competition must also be reckoned a most potent cause of poverty.

A Royal Commission has recently been inquiring into what is generally known as 'Sweating,'—a system which is said to produce much distress among the poorer working people; and the general tendency of the evidence already produced seems to show that Sweating is carried on to a large extent in London and many of the large towns in the provinces. Sweating may be described as the employment of labour by capitalists paying the lowest possible wages for which they can find people to work. For the produce of this labour they charge considerably more than they pay, and thus largely increase their own wealth at the expense of the actual workers. As examples of the payments made under this system, it may be mentioned that as low a price as 2¼d. is paid for making a gross of match-boxes, and poor women have to make a man's shirt for threepence or fourpence. The poverty created by this system is almost incalculable.

The causes upon which we have dwelt are mainly those of a general character; for we have considered the question as a social one. There is, however, much poverty to be attributed to moral causes in the character of individuals. Idleness, intemperance, dishonesty are fruitful causes of distress. But these are causes which for the most part are within the control of the individuals who suffer through them; and as such we do not further deal with them in this place.

The symptoms of the evil have been already referred to, and may be regarded as among the consequences. It seems proper, however, to mention, as one result of poverty, the over-crowding which so lamentably prevails in London and other large towns. The extremely small earnings of many workers will not permit of a sufficient outlay to secure adequate house-room in places where the ground has an abnormal value from the great and increasing demand combined with the limited supply. Intimately connected with over-crowding, are the further consequences of poverty,—dirt, insanitary conditions, disease, and excessive mortality.

Again, though intemperance and crime may often be causes of poverty, there can be no doubt that poverty often drives people to seek forgetfulness of their distress in drunkenness, or a temporary relief from it through dishonest means. There are instances where men have been driven by their poverty to commit petty offences against the law, simply for the sake of getting the temporary shelter and food afforded by the prison.

The remedies which have been tried to mitigate the evil of poverty have hitherto proved very inadequate. This is probably because they have dealt only with the poverty itself, and have not touched its sources. The institution of the workhouse, and the doling out of parish relief, have both fallen far short of what their originators expected of them. Pauperism has come to be looked upon as a disgrace by the respectable poor, though this is possibly on account of the way in which public or official charity is often administered.

Private benevolence does much to alleviate distress in individual cases, and in large classes of cases of a special nature. Thus our numerous hospitals afford relief to those suffering from accident or disease; homes and asylums are provided for poor orphans, for the blind, the deaf and dumb, and for the insane. But charity of this kind cannot effectually deal with the great mass of general poverty.

One remedy proposed is emigration. This might do much good if it could be adopted on any large scale; but many of the poorest people would regard leaving their homes, however poor, as an extreme hardship. Another difficulty arises from the fact that the effect of poverty is to lessen the energies and depress the spirits of its victims, who are therefore ill-fitted to cope with the task which awaits the settlers in a new land, and which demands in a special degree strength, courage, and perseverance. Such as possess these qualities have the best chance of success at home, and do not generally need the benefits of change.

A more rational system of technical and industrial education to follow and supplement that given in our day schools would help to lessen the evil of poverty, by enabling many to do skilled work, or to adapt themselves to different kinds of work, who can now only do such work as needs no training.

An increasing number of thinkers believe that the most effective remedy will be found in improved Land Laws. One of the chief roots of poverty, they say, lies in the injustice of the distribution of land and wealth. Laws have been made chiefly by the rich, and it is natural that they should be more favourable to that class than to the poor. 'Justice,' says Ruskin, 'is the great remedy. "Nay," you will say, "Charity is greater than justice." Yes, it is greater; it is the summit of justice; it is the temple of which justice is the foundation. But you can't have the top without the bottom, you can't build upon charity. You must build upon justice.'

The acts of justice to be done with regard to this question appear to be these: Let us revise the Land Laws, so that the labourer in the country may be tempted to remain there by a reasonable prospect of a happy and prosperous life on the soil which he tills. Let us give a sound liberal and technical education so that the artisan may be able to do something well. Let us pay such wages that every worker may have a fair share of the results of his labour.

If these changes can be accomplished, the evil of poverty, so far as it is a social and not an individual question, may cease to trouble us.

(*To be continued.*)

—o—

How my School was Examined.

BY A

TEACHER IN THE MIDLANDS.

STANDARD I.

Arithmetic.—Two sets of sums were dictated.

A. (1) 289 + 13 + 300 + 742 + 83.
(2) 907 — 76.
(3) 190 — 83.

B. (1) 374 + 39 + 476 + 682 + 75.
(2) 900 + 186 + 35 + 741 + 8.
(3) 760 — 81.

Answers:—*A.* (1) 1,427; (2) 831; (3) 107.
B. (1) 1,646; (2) 1,870; (3) 679.

Writing.—Ten words dictated:—*Proud, Butter, Cheese, Stick, Horse, Picture, Large, Raven, People, Carpet.*

STANDARD II.

Arithmetic.—Two sets of sums were dictated.

A. (1) Take 76,087 from 80,469.
(2) Multiply 49,671 by 87.
(3) Divide 61,015 by 7.
(4) What is the value of 54 pence? 77 pence? 89 pence? 101 pence? 113 pence?

B. (1) Take 19,092 from 116,085.
(2) Multiply 73,095 by 690.
(3) Divide 10,973 by 4.
(4) How much is equal to 33 pence? 71 pence? 87 pence? 117 pence? 141 pence?

Answers:—*A.* (1) 4,382; (2) 4,321,377; (3) 8,716 + 3.
B. (1) 96,993; (2) 50,435,550; (3) 2,743 + 1.

Writing.—The passage dictated was as follows:—

'In the depth of winter, when the snow is on the ground, a wild howl is often heard in the stillness of the night. And in the morning the loss of a cow or horse tells the people that they have had a visit from the wolf.'

STANDARD III.

Arithmetic.—The following are questions which appeared on the cards:—

(1) Divide one hundred and thirty-five thousand and ninety-eight by seventy-nine.

(2) Take nineteen pounds seventeen shillings and nine pence farthing from eleven thousand one hundred pounds twelve shillihgs and nine pence.

(3) Add £69 18s. 4¼d. + £1,098,091 13s. 11d. + £39,742 11s. 3¼d. + £116,374 12s. 9¾d. + 11¾d. + £9 15s. 1¾d.

(4) I bought 127 penny toys, but had only 6s. 9d. to pay with; how much was I short?

(5) 398,614 ÷ 137.

(6) £109,190 15s. 9¼d. - £9,289 12s. 9¾d.

Answers.—(1) 1,710 + 8; (2) £11,080 14s. 11¾d.; (3) £1,254,288 12s. 5¾d.; (4) 3s. 10d.; (5) 2,836 + 82; (6) £99,901 2s. 11½d.

A five-lined addition was given entirely in words and contained the expression three halfpence.

Writing—Dictation exercise.

'During summer, each beaver lives by himself in a burrow, which he digs out near a lake or stream. When winter comes he quits this retreat and unites with his fellows to build a winter home. They generally combine in troops of from one to two hundred, so that the houses form a little beaver town.'

STANDARD IV.

Arithmetic.—Specimen cards.

A. (1) Multiply £619 13s. 7¾d. by 189.
(2) Reduce 4,317,540 seconds to weeks.
(3) Divide six thousand nine hundred and eighty-three pounds eleven shillings and ninepence into 118 equal parts.
(4) A man bought 5 cwt. of soap for £2 10s., and sold it at 2d. per lb. What was his gain?

B. (1) Multiply £709 12s. $10\frac{3}{4}$d. by 83.

(2) A man works 9 hrs. a day and gets $6\frac{3}{4}$d. per hour. At the end of the year he finds he has received £75 18s. 9d. How many days did he work?

(3) Divide £57,803 11s. 9d. by 73.

(4) Reduce 76 tons 96 lbs. to ounces.

Answers.—*A.* (1) £117,119 19s. $0\frac{3}{4}$d.; (2) 7 wks. 23 hrs. 19 min.; (3) £59 3s. $7\frac{3}{4}$d. + $\frac{66}{118}$; (4) £2 3s. 4d.

B. (1) £58,900 10s. $4\frac{1}{4}$d.; (2) 300 days; (3) £791 16s. 7d. + 14; (4) 2,725,376 ozs.

Writing.—Passage dictated: 'It would be thought a hard government that would tax the people one-tenth part of their time to be employed in its service; but idleness taxes many of us much more; sloth, by bringing on disease, shortens life. "Sloth, like rust, consumes faster than labour wears, while the used key is always bright," as poor Richard says.'

Grammar.—Parse the following sentences, *A* and *B* given to alternate children:

A. We find its home in the decayed stump of an old oak.

B. The hardiest of flowers only grow out of doors.

STANDARD V.

Arithmetic.—*A.* (1) Make a bill for the following:—24 articles at $6\frac{1}{2}$d. each, 15 articles at $1/1\frac{1}{2}$ each, 100 reels of cotton at $\frac{3}{4}$d. each, 120 boxes at $9\frac{3}{4}$d. each, 13 books at $5\frac{1}{2}$d. each, 72 pencils at 11/8 per gross.

(2) I had $\frac{7}{8}$ of a sovereign. I gave away $\frac{1}{5}$ of a sovereign, and then half of a sovereign. What fraction of a sovereign have I left?

(3) 24 men can do a piece of work in 40 days. How long would it take 50 men to do the same work?

(4) Find the value of 23 acres 3 rds. 5 pls. at £2 12s. 6d. per acre.

B. (1) Make a bill for the following:—37 yds. of calico at $9\frac{1}{4}$ per yd., 198 yds. of linen at $1/3\frac{1}{4}$ per yd., 8 handkerchiefs at $1/5\frac{1}{2}$ each, 2 doz. pairs of gloves at $2/11\frac{3}{4}$ per pair, 52 toys at $5\frac{1}{2}$d. each, 4 doz. toys at $1/4\frac{3}{4}$ per dozen.

(2) Find the cost of 121 gallons 3 quarts 1 pint at £3 9s. 8d. per gallon.

(3) Add together $\frac{3}{5} + \frac{5}{8} + \frac{3}{10}$.

(4) If a man walks 220 yds. in 3 minutes, how long will it take him to walk $3\frac{3}{4}$ miles?

Answers.—*A.* (1.) 13s. + 16s. $10\frac{1}{2}$d. + 6s. 3d. + £4 17s. 6d. + 5s. $11\frac{1}{2}$d. + 5s. 10d. = £7 5s. 5d.; (2) $\frac{7}{40}$; (3) $19\frac{1}{5}$ days; (4) £62 8s. $6\frac{3}{16}$d.

B. (1.) £1 8s. $6\frac{1}{4}$d. + £12 11s. $7\frac{1}{2}$d. + 11s. 8d. + £3 11s. 6d. + £1 3s. 10d. + 5s. 7d. = £19 12s. $8\frac{3}{4}$d.; (2) £424 10s. $7\frac{1}{2}$d.; (3) $1\frac{11}{15}$; (4) $1\frac{1}{2}$ hrs.

Writing.—Passage dictated:

'Try what you can build up from the broken fragments of your time rendered more precious by their brevity. It is said that in the Mint the floor of the gold-working room is a network of bars, to catch the falling grains of the precious metal; and that, when the day's labour is done, the bars are removed, and the golden dust is swept up, to be melted and coined.'

Grammar.—Two different exercises were set to alternate children.

A. 1. Parse the words underlined and analyse the following sentence:—

'After a *careful search among* the *prickly* leaves one of her brown *speckled eggs* is added to her *spoils*.'

(2) Make nouns from confide, engine, locomotive, machine.

B. (1) Analyse the following sentence, and parse the words underlined:—

'*Armed* with a *poison fang*, the snake at one *stroke avenges herself* on the *unfortunate animal*.'

(2) Make verbs from strong, danger, breath, lock.

STANDARD VI.

Arithmetic.—(1) At what rate per cent. will £425 amount to £$450\frac{1}{2}$, if it be lent for one year only?

(2) Express $\frac{1}{4}$ of 6·175 of a ton in lbs.

(3) If I give away $\frac{3}{8}$ and then $\frac{1}{4}$ of £$22\frac{7}{8}$, what have I remaining?

(4) A man gave $\frac{5}{8}$ of his property to his son, and the remainder to his daughter. The difference in their shares was £50. What was the whole property worth?

Answers:—(1) 6 per cent.; (2) 3,458 lbs.; (3) £8 10s. 10d.; (4) £200.

Writing.—Write a letter comparing a long journey made in the summer with one made in winter.

Grammar.—(1) Parse the words underlined and analyse the sentence:—

'*As* they find by *experience* that snakes are *very docile, they easily train* them to *their own* liking.

(2) Give the prefix in each of the following words, and mention another example of its use:—

Subject, contradict, object, superhuman, compress, attract.

Science Notes.

FEW laboratory experiments have been more wonderful, more instructive or more important than those by which MM. Fougué and Michel Lévy have synthetically reproduced all the modern volcanic rocks. Into a furnace they introduced a platinum vessel containing the mixture out of which the rocks are to be formed. By the application of an intense heat the whole is raised to a white heat, and thereby converted into a glass. The temperature is then lowered and then kept at an orange heat, the fusing point of steel, for some time. The temperature of the crucible is then lowered to a cherry red, at which copper melts, and after a while lowered still further. This is the general method. Suppose it were required to reproduce leucotephrite, a rock which is found in the eruptions of Vesuvius. Silica, alumina, lime, ferric oxide, potash and soda are taken in suitable proportions. These are heated to a white heat. The glass is then cooled to the melting point of steel, and allowed to remain at it for 48 hours. During this time crystals of leucite separate out. The crucible is then subjected to the temperature of fused copper for 48 hours. The mass which remained after the crystals of leucite had fallen out is now transformed into microliths of augite and labrador felspar, with octahdra of magnetite and picotite. By the application of this method of heating, and then allowing the mixture to stand at pretty constant temperatures for considerable periods of time, many other important results were reached. The origin of basalt, for example, was for a long time believed to involve the action of water. This has been found to be wrong. The conclusion seems justified that modern volcanic rocks in general have been formed by a fusion purely igneous.

⁂

We learn from *Nature* that the Secretary of the Royal Botanic Society has reported that the recent fogs had done much damage to the plants in the conservatories, causing many of them to shed both leaves and flower buds. More especially was this the case with Australian plants, which from enjoying in their own country a large amount of sunlight, were found to be less cabable than any others in contending against the vicissitudes of London weather. It is thought that fogs are increasing both in London and elsewhere. Plants suffer not only from the absence of light but also from the pores of their leaves becoming filled up with the sulphurous sooty matter contained in London fogs.

⁂

In the Kew Bulletin there is an interesting note on the Coca-plant, to which much importance has been attached on account of the valuable properties ascribed to one of its alkaloids called Cocaine as a local anæsthetic. Since the discovery of the anæsthetic properties of Cocaine the demand for the Coca leaves of South America has considerably increased for exportation. In the transit there has been a distinct loss in the alkaloids generally as well as in the Cocaine, and latterly it has been customary to extract the alkaloids from the leaves in South America and export a crude preparation to Europe and the States which is largely taken up by those who manufacture Cocaine. The demand therefore for Coca leaves has fallen off, and it is not likely that the growth of Coca leaves in our tropical colonies will ever assume any considerable proportions. South America alone is able to produce such an enormous quantity of Coca leaves that one per cent. of them would be more than enough to supply all the Cocaine markets in the world.

⁂

The unusually cold weather experienced in England and Western Europe last October and November was also felt in Russia and Central Asia. The first fortnight in November was unusually cold in East and South Russia, colder than an average by 16—20 C. The rivers were covered with ice much earlier than usual. Two great waves of cold could be distinguished, both spreading from the north-west to the south-east. In the second part of November there was a sudden return of warm weather and the Russian rivers were opened again. Throughout this disturbed period the barometer gave valuable indications as to the movements of the cyclones and anti-cyclones. The high pressure reached 30·7 inches and moved with greater steadiness. The low pressure was about 28·4

⁂

Dr. W. Fream has just published the result of an important original investigation on the herbage of rye grass—practically upon the best way of producing a rich pasture; a most interesting subject to the farmer and land owner, since good grass land is easy to let even in these bad times. To plough up grass land has always been easy enough, but to convert tillage into good pasture is another and a harder problem. The result of the elaborate investigation is to justify the popularity with farmers of rye grass. Some years ago, a determined set was made against this grass. It was derided by a specialist and avoided by advanced agriculturists.

⁂

At the Central Institution of the City Guilds, Professor Armstrong will give about ten lectures on some of the most important current problems in Chemistry, on Mondays at 4.30, commencing Jan. 21. The following subjects will be dealt with so far as time permits. The nature of chemical change, the interdependence of chemical change and electrolysis, molecular composition of gases, liquids and solids; nature of solution, physical constants, laws of substitution and isomeric change as bearing on the nature of chemical change, valency, geometrical, and allo-isomerism.

Certificate Examination, 1888.

Male Candidates.

FIRST AND SECOND YEARS.

Geography.

(Two *hours and a* HALF *allowed for this Paper.*)

Candidates may answer only THREE *of the first* FIVE, *and only* FOUR *other questions.*

Small sketch maps or diagrams may be drawn to illustrate any answer, at the candidate's discretion.

1. Explain why in the belt between the tropics the sun appears vertical in the sky twice in a year. Why does not an accurate clock always indicate twelve when the sun is on the meridian? Why are three of the leap years common years in each cycle of 400 years?

(1) (*a*) The sun shines vertically over the Tropic of Cancer on midsummer day. In six month's time the earth will have revolved half its course round the sun and will therefore be on the opposite side from that occupied in June. Now owing to the axis of the earth being inclined to the plane of its orbit 23½° and also because the axis maintains a constant direction, the Northern Hemisphere, which in June was inclined towards the sun, will in December be inclined away from the sun, and instead of the earth receiving direct and vertical rays over the Tropic of Cancer 23½° north of the Equator, those rays will now fall direct and vertical upon the Tropic of Capricorn 23½° south of the Equator. This change in the position of the vertical rays is a gradual one, and during the six months between midsummer and midwinter the sun shines directly over head once upon every portion of the belt between the tropics. During the six months between December and June the change explained above is repeated, only in a contrary direction, so that twice each year the sun's rays fall vertically over every portion of the Torrid zone, owing to the earth revolving round the sun with its axis inclined 23½° and maintaining a constant direction.

(*b*) An accurate clock is constructed to keep the same absolute interval of time between 12 o'clock on any one day and 12 o'clock the succeeding day. The Solar day, however, is constantly changing its duration for two reasons. (1) Because the earth's motion round the sun varies constantly from day to day owing to its perihelion and aphelion positions, and (2) Because the sun's apparent motion is not in a true east and west direction, but along the plane of the ecliptic; hence at the solstices its apparent movement eastward is greatest, at the equinoxes least, and between these two extremes the easterly movement is constantly varying.

(*c*) The earth completes its course round the sun in about 365¼ days. The civil year consists of 365 days. In order to correct for the loss of the ¼ of a day each year an extra day is added to the calendar every fourth year, *i.e.*, Leap year. This correction, however, still leaves an error inasmuch as the amount added is too much by 11 minutes 12 seconds each year. In order, therefore, to correct for this excess Pope Gregory ordered that every hundredth year should not be a Leap year, with this exception that every 400th year should be one.

2. How is rain formed? Why is the rainfall on the west of Great Britain greater than on the east? Explain why the country on the east of the Western Ghats receives comparatively little rain.

(2) Rain is formed by the condensation of the moisture in the atmosphere. The invisible vapour is first changed into visible, or into cloud, and then, by further condensation and the coalescing of the moisture particles, rain drops are formed. The west of Great Britain is favourably situated for considerable rainfall on account of the prevalent and very moist westerly winds. The winds are, however, forced up the mountain slopes, and are thus lowered in temperature; the vapour they contain is quickly condensed, forming large cloud masses, and yielding a heavy rainfall.

The district east of the Western Ghats is subject to two sets of winds, one from the south-west, another from the north-east. The south-west monsoon, after passing over the Western Ghats, has lost much of its moisture, and when it descends to the plateau on the east, instead of further condensation, the temperature is heightened, and the capacity for moisture increased, so that the wind, which has been a very moist wind on the western slopes of the Ghats, becomes a dry wind on the eastern side. The north-east monsoon blows for the most part over the land, and is therefore also a dry wind. Thus both the prevalent winds in this area are comparatively dry winds.

3. Explain the terms: constant winds, periodic winds, local winds, with examples. What are spring tides? At the port of Batsha the tidal wave comes in by two distinct channels, such that the time of arrival of the one is six hours later than of the other. How will the tide there be affected?

(3) **Constant Winds.**—These are winds which, like the trade winds in tropical regions, blow constantly over the Atlantic from Africa towards America, and from America across the Atlantic towards Asia.

Periodic Winds are those which, like the monsoons and land and sea breezes, change their direction regularly, either according to the season of the year or the time of the day.

Local Winds are such as blow with a certain amount of prevalence, and with such distinctive characteristics as to have a marked effect upon the climate of the district over which they blow, *e.g.*, the *Simoon* of the desert; the *Sirocco* of Southern Europe; the *Föhn* of the Alpine region; the *Mistral* of Southern France; and the *Harmattan* of Senegambia.

Spring Tides are the high tides which ordinarily occur once a fortnight shortly after the phase of new and full moons respectively.

In the case of the port mentioned, if only the first tide acted the water would be at low tide six hours after the high tide, but at this time the second tide is up, so that instead of the low tide a second high tide occurs. There would thus be no really low tide in the port at all, but two high tides every six hours, with a slight lowering of the tide level for about three hours, and then a gradual rise during the following three hours.

4. How is climate affected (1) by distance from the Equator, (2) by local influences? Why are the climates in the southern hemisphere distributed with much regularity according to latitude?

(4) (*a*) *Distance from Equator.*—At or near the Equator the rays of the sun shine vertically, whilst in high latitudes the sun's rays fall more or less obliquely, the amount of obliquity being dependent upon the distance north or south of the Equator. When two similar areas receiving the rays of the sun are compared as to the amount of heat received, it is found that the area upon which the rays fall directly receives much more heat than the area upon which the rays fall obliquely; further, not only do more heat rays proceed from the sun to the former area, but in consequence of the small thickness of the atmosphere through which these heat rays pass (as compared with the amount of atmosphere through which the oblique rays pass) there is far less absorption and reflection of the vertical or almost vertical heat rays than of those more oblique. Hence for these two reasons temperature is affected by latitude.

(*b*) *Local influences.*—**Proximity to the Sea** is one of these. On account of the high specific heat of water it changes in temperature very slowly, so that an insular climate is subject to much less variation of temperature than a neighbouring continental area in the same latitude.

Elevation is a second local condition. The air being warmed mainly by conduction and radiation from the heated land surface, a position on a mountain side is surrounded by air, which has not so much land surface to warm it as the air on the plain below. Besides this, the air is generally drier the higher we ascend, and this again lessens very greatly the power of the atmosphere to retain heat.

Local Winds affect the climate of a district, *e.g.*, the cold easterly winds of our spring may be compared with the warm and moist south-westerly winds of our summer and autumn.

Ocean Currents again carry warmth to definite localities, *e.g.*, the ports of Western and Northern Norway are open throughout the winter owing to the Gulf Stream and its continuation north-eastward. Nain, on the opposite shore of the Atlantic, in Labrador (near which the cold Arctic current passes), has one of the most severe climates known.

(*c*) *Climate in Southern Latitudes.*—In consequence of the land area being very limited in the southern hemisphere, and the water maintaining an almost constant temperature throughout the year, the climate is much more equable for given latitudes than is possible in the northern hemisphere, where, as we have seen above, many causes are at work to vary the climate over areas at the same latitude.

5. Give some account of the plants and animals found in Australia.

(5) The **Plant Life** of Australia is peculiar. In the first place nearly all the trees are evergreens; the change of seasons therefore has very little effect upon the appearance of the country. The larger growths are chiefly the *acacias* and the gum trees (*eucalypti*). No edible fruit-growing trees are indigenous, but most of the European varieties have been introduced, and with encouraging results. The greater number of species of plant life found in Australia belong to the cryptogamia, the tree ferns being the most striking example. Vegetation is not arranged in the usual zones in Australia, but the distribution follows the change of soil rather than change of latitude.

The **Animal Life** of Australia is more novel even than that of its plants. Of the entire species of animals only $\frac{1}{13}$th are common to those of other districts. All the quadrupeds, with the exception of the dog and rat, are peculiar to the continent, and most of them belong to the order termed *marsupials*, because they are provided with a pouch in which they carry their young after birth; the kangaroo is a well-known example.

Bird Life is less peculiar, but the emu (a kind of ostrich) is remarkable. Parrots abound, and a strange animal, with the body and fur of an otter and the bill of the duck (*the ornithorhynchus*), should be noted. **Reptiles** are neither numerous nor dangerous, except a species of crocodile, found along the northern and western coasts.

6. Name three places suitable for emigration, the principal advantages of each place, the kinds of employment an English settler would probably find at each, and the route by which he would travel to each from England.

(6) **New Zealand** is a suitable colony for English emigration, in the first place because of its temperate climate and its fertile soil; because, further, it has a settled Government with sound and just laws; it possesses also abundant space for further development. The most suitable persons are those who have some capital which they wish to invest in farming, and who have knowledge of the management of land and cattle, and who, above all, have robust health and industrious and thrifty habits. Such persons soon find employment, they quickly add to the land already under cultivation, and soon materially increase the wealth of the colony. The best way to travel for an English settler is to take his passage in a sailing vessel direct. He would in that case pass down the Channel across the Bay of Biscay, southwards along the African side of the Atlantic until the Trades were reached; then a course would be taken towards Rio, after passing which advantage would be taken of the return currents, and the N.W. return Trades, to sail towards Australia and thence to New Zealand.

Canada is a much older colony, and therefore presents much greater variety of employment. Labourers and skilled artisans readily find employment anywhere, whilst in the West in districts like Manitoba, recently opened out by the Canadian Pacific Railway, farmers with small capital thrive. Canada is reached by steamship direct from Liverpool across the Atlantic to Quebec, or may be reached by journey to New York, and thence to Ontario or Montreal by rail.

Cape Colony is a third district, well suited for emigration. The climate is excellent, the land fertile and abundant, and the Government settled and secure. Domestic servants, artisans and farm servants are the kind of people most in request. Sheep-farming and cattle rearing on the uplands is an extensive occupation. Here again land can be acquired for the money which in England would only rent it, and small capitalists who have skill and experience may soon become wealthy members of the colony. Cape Colony is reached by steamship direct from London in about three weeks, the course being from London to Dartmouth, to the Madeiras, and thence direct to Cape Town Port Elizabeth.

7. From what British possessions (or colonies) do we obtain maize, quinine, rice, diamonds, hides, jute, ostrich feathers, teak, and wool.

(7) Maize is obtained from	Cape Colony, Natal, Australia, and the West Indies.
Quinine ,, ,,	The Neilgherry District (India).
Rice ,, ,,	India, Singapore, Malacca, Brit. Guiana, W. Indies.
Diamonds ,, ,,	Cape Colony and Natal.
Hides ,, ,,	India, Cape Colony, Natal, Australia, New Zealand, Falkland Islands, Western Africa.
Jute ,, ,,	India.
Ostrich Feathers ,,	Cape Colony and Natal.
Teak ,, ,,	India.
Wool ,, ,,	India, Cape Colony, Natal, Australia, New Zealand, Tasmania.

8. Describe the course of the Indus, or the St. Lawrence; naming the chief towns and tributaries; and stating the character of the adjacent country.

(8) The St. Lawrence is the chief river in the Dominion. It rises in the St. Louis, a small stream entering the western extremity of Lake Superior, The Great Lakes form the most striking feature in the upper basin of the river. Lake Superior is the largest of these, and is united by a narrow channel to Lake Huron. In Huron also flows the water of Lake Michigan. The shores of these lakes, with the exception of the southern portions of Huron and Michigan, are bleak and uninteresting, and are only valuable for the copper mines along them. The southern shores are much more fertile, and Chicago, on Michigan, and Goderich, Collingwood, and Sarnia, on Huron, are rapidly rising and important towns. The river and Lake St. Clair, into which flow the Thames and the River Detroit unite Huron with Lake Erie. This lake is in the midst of fertile surroundings, and has the large towns of Ports Stanley, Dover, Colborne, Buffalo, and Cleveland standing upon its banks. Between Lakes Erie and Ontario are the famous Falls of Niagara. The peninsula between the Georgian Bay in Lake Huron and the Lake of Ontario is the most fertile, and is rapidly becoming the most densely peopled of the entire Dominion. The chief towns of this district are Hamilton, Toronto, Cobourg, Kingston and Belleville. After leaving Ontario the river takes the name of the St. Lawrence. The River Ottawa is the chief tributary on the left bank. On it stands Ottawa, the capital of the Dominion, and near where the river enters the St. Lawrence stands Montreal, one of the finest towns and ports in the New World. The St. Maurice and the Saguenay are other tributaries on the right bank. Three Rivers is an important town at the mouth of the St. Maurice. Quebec, the old capital, is an important port and fortress. The river here is two miles in width. The rivers entering on the American side are the Richelieu, the St. Francis, and the Chandiere; all these flow in a thickly wooded and sometimes mountainous district, with intervening plains very fertile and well cultivated.

9. Give notes of a lesson to an upper class on the physical features, climate, chief towns, and industries of South Island (New Zealand).

(9)

INFORMATION.	HOW TAUGHT.
A Physical Features.	
1. Mountains.	
(*a*) A well-defined mountain ridge runs from the N.W. along the western coast, from Cape Farewell to West Cape in the south.	Prepare a sand model and a sketch map of the coast line only.
(*b*) *Peaks, &c.—In the north* the range is named after Tasman, with the summits of Snowdon, Peel and Arthur.	Show the position of each portion of the range, and as each is indicated on the model put in the position on the sketch map.
In Nelson Province the range is called Spenser range, with Franklin as the highest point. *In the South* the range becomes divided into several parallel ranges, with Mount Odin and Kaitarau as the chief peaks.	Write down the names in full and connect them with the discoverers whose names they bear. If native, the names need to be written very distinctly, so that their spelling may be remembered.
2. Plains, Valleys and Rivers:	
Running from the main ridge in the west are several spurs and minor hill ranges, which give an undulating character to the central and eastern districts. Through the valleys thus formed the chief rivers of the island flow. These are Wairau, Clarence, Grey and Buller in the north; Hurunui, Selwyn, and Waitaki in the centre; and the Clutha and Waiau in the south.	These ridges should be taught first from the model. The valleys follow the hill ranges and should be associated with the hills on either side, and the rivers in their midst. The names of these rivers should be written out in full, and their places indicated on both map and model.
B. Climate:	
(*a*) *Latitude.*—The same as S. Europe, hence warmer than England.	This comparison requires the reference to a map of Europe.
(*b*) *Proximity of Sea.*—On this account subject to fewer changes of temperature with sufficient moisture to assist vegetation. (*c*) *Elevation.*—No great heights to chill the breezes by their snowy slopes. A beautiful climate, in every way agreeable to Englishmen.	The sea shores along the south of Europe in winter may be compared to those of New Zealand; but the heat of summer is not nearly so great as in the South of France. Show this by stating that the climate of London is 3° colder than in South Island.
C. Industries:	
The prime occupation is that of agriculture. *Pasturage* with flocks of sheep. *Tillage* with corn, maize, barley and potatoes. Mining of gold in Nelson and Marlborough.	Teach by the necessity of Colonies first to obtain food. Then to supply others in order to obtain wealth.
D. Towns:	
Nelson, on Tasman Bay; Blenheim, near Cloudy Bay; Christchurch, near Pegasus Bay; Dunedin, on Otago Harbour; Hokitika, in Westland; Invercargill, in Southland.	Besides the association of town with bay, the size and trade of each town might be added.

10. Give the position, as nearly as you can, of the following places, and mention any notable facts concerning them:—Adelaide, Aden, Balmoral, Colombo, Georgetown, Kingstown, Kingston, Limerick, Montreal, New Westminster, Plymouth.

(10)

1. Adelaide, on the River Torrens Port Adelaide, its port, is seven miles distant. It is the capital of South Australia, and has a population of about 50,000.

2. Aden, near the entrance of the Red Sea. It is a fortified port, and a coaling depôt on the overland route.

3. **Balmoral**, on the River Dee, in Aberdeen, is the Highland residence of the Queen.

4. **Colombo**, in the S.W. of Ceylon, is the capital of the colony.

5. **Georgetown**, on the coast, is the chief town in British Guiana.

6. **Kingston**, at the mouth of the Cobre, is the capital of Jamaica.

7. **Limerick**, on the Shannon, the chief seaport on the S. W. of Ireland.

8. **Montreal**, on the St. Lawrence, the largest and most commercial city in Canada.

9. **New Westminster**, on the Fraser River, a town in British Columbia.

10. **Plymouth**, on Plymouth Sound, the largest port in the S.W. of England, with a naval dockyard and a splendid harbour.

11. Describe Cape Colony, referring briefly to each of the following points:—When discovered and how then named—boundaries—capes and bays—mountains—climate—minerals—chief rural industry—animals.

(11)

1. **Discovery.**—The Cape of Good Hope was discovered by a Portuguese named Bartholomew Diaz, 1486, who first named it *The Cape of Storms.*

2. **Boundaries.**—W., by the Atlantic Ocean.

S.E., by the Indian Ocean.

N., by the Orange River, from its mouth to Griqualand; the boundary includes the latter district; from thence eastward south of the Orange Free State, and along to Drakenfeld to near Delagoa Bay.

3. **Capes and Bays.**—Table Bay, Cape of Good Hope, with Simon's Bay. These were the regions first colonised; eastward is Cape Agulhas, the most southern point in Africa; Algoa Bay, with Port Elizabeth near, is the most important seaport in the S.E.

4. **Mountains.**—The mountain ranges in Cape Colony follow very regularly the line of coast.

1. The Nieu-we-veld mountains form the southern limit of the Orange River basin. They are continued eastward by the Storm Berg and the Drakenberg Mountains.
2. The Zwarte Mountains form a parallel range to the south of the Nieu-we-veld. The district between the two ranges is called the Great Karroo.
3. Nearer the coast are the Swellendam Mountains.

5. **Climate.**—The climate of Cape Colony is healthy. It is drier than than the English climate. At times there is liability to drought.

6. **Minerals.**—**Copper** in the north-west is mined extensively. **Diamonds** are found in the north. **Gold** in Namagualand.

7. **Rural Industries.**—Cattle and sheep-rearing, breeding of horses and ostriches. Cultivation of ordinary cereals, the vine, and some cotton and tobacco.

8. **Animals.**—The wild animals are—**Elephants, Tigers, Lions, Hyænas, Leopards,** and **Antelopes.**

The ordinary *domestic cattle* are abundant.

The keeping and rearing of **Ostriches** is an important industry. The **Silkworm** has been introduced.

Male Candidates.

FIRST YEAR.

Mental Arithmetic.

(Twenty minutes allowed for this paper.)

You are to enter the answer in the space (——) left for it after each question. Nothing is to be written on this paper except the particulars required and the answers (which must be written in ink only) to the questions. *No erasures or alterations are permitted.* They will be marked as errors.

1. ·1875 × 17s. 4d. reduced to the fraction of 19s. 6d. = (——).

$$= \frac{3}{\cancel{16}} \times \frac{\overset{\cancel{13}}{\cancel{208}}}{\underset{\underset{6}{\cancel{78}}}{\cancel{234}}} = \underline{\tfrac{1}{6}}.\ \text{Ans.}$$

2. The length cut off a board $5\frac{1}{2}$ feet long, 17 inches wide, so that area of part remaining is $4\frac{1}{4}$ square feet = (——).

$$= 5\tfrac{1}{2}\text{ ft.} - (4\tfrac{1}{4} \div \tfrac{17}{12})\text{ ft.} = 5\tfrac{1}{2}\text{ ft.} - \left(\frac{\cancel{17}}{\cancel{4}} \times \frac{\overset{3}{\cancel{12}}}{\cancel{17}}\right)\text{ ft.}$$

$$= \underline{2\tfrac{1}{2}\text{ ft.}}\ \text{Ans.}$$

3. $\dfrac{3\frac{2}{5} + 2\frac{3}{4}}{3\frac{2}{5} - 2\frac{3}{4}}$ in simplest form = (——).

$$= \frac{\frac{17}{5} + \frac{11}{4}}{\frac{17}{5} - \frac{11}{4}} = \frac{68 + 55}{68 - 55} = \frac{123}{13}$$

$$= \underline{9\tfrac{6}{13}}.\ \text{Ans.}$$

4. Discount on £393 15s. due 5 years hence at $2\frac{1}{2}$ per cent. per annum simple interest = (——).

$$= \frac{2\frac{1}{2} \times 5}{100 + 2\frac{1}{2} \times 5} \text{ or } \frac{12\frac{1}{2}}{112\frac{1}{2}} \text{ or } \frac{25}{225}$$

or $\frac{1}{9}$ of £393 15s. = $\underline{\text{£43 15s.}}$ Ans.

5. If $(17^2 - 16^2) \div 99 - 23 + 26 = x$;

then $\dfrac{x}{10} - \dfrac{1}{3} =$ (——).

$$x = (17 + 16) \div 99 = \tfrac{1}{3} - 23 + 26 = 3\tfrac{1}{3};$$

$$\text{then } 3\tfrac{1}{3} \div 10 = \tfrac{1}{3} - \tfrac{1}{3} = \underline{0}.\ \text{Ans.}$$

6. $1053x$ is a perfect square; least value of x = (——).

$$= 9 \times 117x = 9 \times 9 \times 13x = \underline{13}.\ \text{Ans.}$$

7. A can do a work in 4, B in 5 days. After working together one day, B leaves. Time in which A will finish it = (——).

$$= [1 - (\tfrac{1}{4} + \tfrac{1}{5})] \div \tfrac{1}{4} = \frac{11}{\underset{5}{\cancel{20}}} \times \frac{\cancel{4}}{1}$$

$$= \underline{2\tfrac{1}{5}}\text{ days.}\ \text{Ans.}$$

8. 690 things at 19s. 4d. = (——).

$$= \text{£}690 - \frac{\cancel{8}}{\underset{30}{\cancel{240}}} \text{ of £}690$$

$$= \text{£}690 - \text{£}23 = \underline{\text{£}667}.\ \text{Ans.}$$

9. Fourth proportional to 143, 273, 187 = (——).

$$= \frac{\overset{21}{\cancel{273}} \times \overset{17}{\cancel{187}}}{\underset{\cancel{13}}{\cancel{143}}} = \underline{357}.\ \text{Ans.}$$

or = 11 : 21 :: 187 : 4th term.

= 21 × 17 = 357.

10. By selling a carriage for £46 16s., a man gained one-fifth of cost price. If he had sold it for £52, gain per cent. on cost price = (——).

Cost price = £46 16s. × $\frac{5}{6}$

= £234 ÷ 6 = £39;

Gain per cent. = (£52 − £39) × $\frac{100}{39}$

= 13 × $\frac{100}{39}$

= 100 ÷ 3 = $\underline{33\frac{1}{3}}$. Ans.

11. 4 cwt. 1 qr. 16 lbs. at £4 13s. 4d. per qr. = (——).

$$= \text{£}4\tfrac{2}{3} \times 17\tfrac{4}{7} = \left(\frac{\overset{2}{\cancel{14}}}{\cancel{3}} \times \frac{\overset{41}{\cancel{123}}}{\cancel{7}}\right)\text{£}$$

$$= \underline{\text{£}82}.\ \text{Ans.}$$

12. Income from investment of £833 5s. in Three per Cents. at 101 = (——).

= £833 5s. × $\frac{3}{101}$

= £8 5s. × 3 = $\underline{\text{£24 15s.}}$ Ans.

13. Simple interest on £9,601 for 3 years at $2\frac{1}{2}$ per cent. per annum = (——).

$2\frac{1}{2}\% \times 3 = 7\frac{1}{2}\% = 5\% + 2\frac{1}{2}\% = \frac{1}{20} + \frac{1}{40}$

= $\frac{1}{20}$ of £9,601 + $\frac{1}{2}$ of $\frac{1}{20}$ of £9,601

= £480 1s. + £240 0s. 6d.

= $\underline{\text{£720 1s. 6d.}}$ Ans.

14. £31 12s. was divided amongst 3 persons in the proportion of $\frac{2}{5}$, $\frac{1}{6}$, $\frac{3}{4}$; the smallest share = (——).

$$\tfrac{2}{5} + \tfrac{1}{6} + \tfrac{3}{4} = \frac{24 + 10 + 45}{60} = \tfrac{79}{60}$$

$$= \text{£}31\ 12\text{s.} \times \tfrac{10}{79} = \text{£}316 + 79 = \underline{\text{£}4}.\ \text{Ans.}$$

ALTERNATIVE PAPER.

1. 648 things at 19s. 2d. = (——).

$$= £648 - \frac{1\cancel{0}}{24\cancel{0}} \text{ of } £648$$

$$= £648 - £27 = \underline{£621.}\ \text{Ans.}$$

2. £13 6s. was divided amongst 3 persons in the proportion of $\frac{2}{3}, \frac{3}{4}, \frac{4}{5}$; the largest share = (——).

$$\frac{2}{3} + \frac{3}{4} + \frac{4}{5} = \frac{40 + 45 + 48}{60} = \frac{133}{60}$$

$$= £13\ 6s. \times \frac{48}{133} = 2s. \times 48 = \underline{£4\ 16s.}\ \text{Ans.}$$

3. Simple interest on £8,001 for 4 years at $1\frac{2}{3}$ per cent. per annum = (——).

$$1\tfrac{2}{3}\% \times 4 = \tfrac{20}{3}\% = \frac{2\cancel{0}}{30\cancel{0}} = \tfrac{1}{15} \text{ of } £8,001$$

$$= £2,667 \div 5 = \underline{£533\ 8s.}\ \text{Ans.}$$

4. By selling a carriage for £27 4s. a man lost one-fifth of cost price. If he had sold it for £51, gain per cent. on cost price = (——).

$$\text{Cost price} = £27\ 4s. \times \tfrac{5}{4}$$

$$= £136 \div 4 = £34;$$

$$\text{Gain per cent.} = (£51 - £34) \times \tfrac{100}{34}$$

$$= 17 \times \tfrac{100}{34}$$

$$= \underline{50.}\ \text{Ans.}$$

5. 4 cwt. 2 qrs. 16 lbs. at £5 5s. per qr. = (——).

$$= £5\tfrac{1}{4} \times 18\tfrac{4}{7} = \left(\frac{\overset{3}{\cancel{21}}}{\underset{2}{\cancel{4}}} \times \frac{\overset{65}{\cancel{130}}}{\cancel{7}}\right)£$$

$$= £\tfrac{195}{2} = \underline{£97\ 10s.}\ \text{Ans.}$$

6. Income from investment of £726 15s. in Three per Cents. 102 = (——).

$$= £726\ 15s. \times \tfrac{1}{102}$$

$$= £7\ 2s.\ 6d. \times 3$$

$$= \underline{£21\ 7s.\ 6d.}\ \text{Ans.}$$

7. If $(19^2 - 18^2) \div 74 - 19 + 23 = x$:

then $\frac{x}{9} + \frac{1}{2} =$ (——).

$x = (19 + 18) \div 74 = \frac{1}{2} - 19 + 23 = 4\frac{1}{2}$; then $4\frac{1}{2} \div 9 = \frac{1}{2} + \frac{1}{2} = \underline{1.}$ Ans.

1. Fourth proportional to 126, 351, 154 = (——).

$$= \frac{\overset{39}{\cancel{351}} \times \overset{11}{\cancel{154}}}{\underset{9}{\cancel{126}}} = \underline{429.}\ \text{Ans.}$$

$$\text{or} = 14 : 39 :: 154 : \text{4th term.}$$

$$= 39 \times 11 = 429.$$

9. ·3125 of £1 1s. 4d. reduced to the fraction of £1 3s. 4d. = (——).

$$= \frac{5}{\cancel{16}} \times \frac{\overset{\overset{2}{\cancel{4}}}{\cancel{64}}}{\underset{\underset{7}{\cancel{14}}}{\cancel{70}}} = \underline{\tfrac{2}{7}.}\ \text{Ans.}$$

10. A can do a work in 3, B in 4 days; after working together 1 day B leaves. Time in which A will finish it = (——).

$$= [1 - (\tfrac{1}{3} + \tfrac{1}{4})] \div \tfrac{1}{3}$$

$$= \frac{5}{\underset{4}{\cancel{12}}} \times \frac{\cancel{3}}{1} = \underline{1\tfrac{1}{4}\ \text{days.}}\ \text{Ans.}$$

11. $833x$ is a perfect square; least value of x = (——).

$$= 49 \times 17x = \underline{17.}\ \text{Ans.}$$

12. The length cut off a board $5\frac{1}{2}$ feet long, 19 inches wide, so that area of part remaining is $4\frac{3}{4}$ sq. feet = (——).

$$= 5\tfrac{1}{2}\text{ ft.} - (4\tfrac{3}{4} \div 1\tfrac{7}{12})\text{ ft.}$$

$$= 5\tfrac{1}{2}\text{ ft.} - \left(\frac{\cancel{19}}{\cancel{4}} \times \frac{\overset{3}{\cancel{12}}}{\cancel{19}}\right)\text{ ft.} = \underline{2\tfrac{1}{2}\text{ ft.}}\ \text{Ans.}$$

13. Discount on £386 11s. due $2\frac{1}{2}$ years hence at 5 per cent. per annum simple interest = (——).

$$= \frac{2\frac{1}{2} \times 5}{100 + 2\frac{1}{2} \times 5} \text{ or } \frac{12\frac{1}{2}}{112\frac{1}{2}} \text{ or } \tfrac{25}{225}$$

$$\text{or } \tfrac{1}{9} \text{ of } £386\ 11s. = £42\ 19s.\ \text{Ans.}$$

14. $\dfrac{4\frac{1}{4} + 3\frac{4}{5}}{4\frac{1}{4} - 3\frac{4}{5}}$ in simplest form = (——).

$$= \frac{\frac{17}{4} + \frac{19}{5}}{\frac{17}{4} - \frac{19}{5}} = \frac{85 + 76}{85 - 76} = \tfrac{161}{9}$$

$$= \underline{17\tfrac{8}{9}.}\ \text{Ans.}$$

Male Candidates.

FIRST YEAR.

Arithmetic.

(TWO hours and a HALF allowed for this paper.)

Candidates are not permitted to answer more than TEN questions, and are advised to answer the first.

The solution must be given at such length as to be intelligible to the examiner, otherwise the answer will be considered of no value.

1. (*a*) Employ short division in dividing 4103 by 105, taking the factors 3, 5, 7, and explain clearly your method of obtaining the remainder.

(*b*) Show that the rule for extracting cube root in arithmetic is based on the algebraical method. Find the cube root of 493039 to illustrate your remarks.

(*c*) Define *prime numbers*, *proportion*, *average*, *par of exchange*, *discount*, with examples.

(*d*) Give rules for mental solutions in the following cases:—(1) to multiply by 625; (2) the price of any number of things at 2s. 1d. each; (3) simple interest at $6\frac{1}{4}$ per cent. per annum; (4) difference of squares of two consecutive numbers.

(*a*)

$$105\left\{\begin{array}{l|l} 3 & 4103 \\ 5 & 1367 \ldots 2 \\ 7 & 273 \ldots 2 \\ & 39 \end{array}\right. \quad 3 \times 2 + 2 = 8$$

Quotient = 39 and 8 remainder. Reason for obtaining the remainder. After dividing the given number by 3, we obtain 1367 threes, and a remainder of 2 units.

We now divide 1367 threes by 5, and obtain 273 fifteens and a remainder of 2 threes or 6 units, and this added to the former remainder of 2 units, gives a remainder of 8.

As there is no remainder from dividing 273 fifteens by 7, the total remainder is 8.

(*b*) $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$;

$$\begin{array}{lll} & & a^3 + 3a^2b + 3ab^2 + b^3\ (a + b \\ & & a^3 \\ \hline 3a + b & 3a^2 & 3a^2b + 3ab^2 + b^3 \\ & \quad + (3a + b)b & \\ \hline & \underline{3a^2 + 3ab + b^2} & \underline{3a^2b + 3ab^2 + b^3} \end{array}$$

$$\begin{array}{lll} & & 493\dot{0}3\dot{9}\ (70 + 9 \\ & & \underline{343000} \quad = 79 \\ 210 + 9 & 14700 & 150039 \\ = 219 \times 9 = & \underline{1971} & \\ & \underline{16671} & \underline{150039} \end{array}$$

The ciphers may be omitted for brevity, and the process will stand thus:—

$$\begin{array}{lll} & & 493\dot{0}3\dot{9}\ (79 \\ & & \underline{343} \\ 219 & 147 & 150039 \\ \times 9 = & \underline{1971} & \\ & \underline{16671} & \underline{150039} \end{array}$$

(*c*) A prime number has no factors but itself and unity. Thus, 7, 19, 23 are prime numbers.

When the measure of one ratio is equal to the measure of another ratio, the four quantities are said to be in proportion. Thus, the measures of the ratios 4 to 9 and 8 to 18 are both of them $\frac{4}{9}$, therefore the four quantities 4, 9, 8, and 18 are said to be in proportion.

The average or mean of any number of given quantities of the same kind is that quantity, which when put in place of each of the given quantities makes their sum the same. Hence, to find the average of any number of quantities, we divide the sum of them by their number.

Thus, the average of 3, 7, and 8 = 3 + 7 + 8 ÷ 3 = 18 + 3 = 6.

The relation between the standard coins of two countries, as determined from their intrinsic value, is called the nominal rate of exchange, or par of exchange.

If payment of a sum of money, due in France, be made by sending specie there, we must ascertain how many francs will be given for a sovereign at the French mint; and this is deduced by making a comparison between the weight and fineness of the metals composing the sovereign and the standard coin of France. The result is found to be 25·17 francs, and is called the par of exchange between the two countries.

Discount is the abatement made when a sum of money is paid before it is due, and is the interest of the present worth for the given time at the given rate.

Thus the discount on £105 due 1 year hence at 5 per cent. is £5, for it is the interest on £100 (present worth).

(*d*)—(1) $625 = \frac{10000}{16}$.
Rule.—Add 0000, and divide by 16.

(2) 2s. 1d. = $£\frac{25}{240} = £\frac{5}{48} = £\frac{10}{96}$.
Rule.—Add 0, and divide by 96; answer in pounds.

(3) $6\frac{2}{3}$ per cent. $= £\frac{6\frac{2}{3}}{100} = £\frac{20}{300} = £\frac{1}{15}$.
Rule.—Take $\frac{1}{15}$ of the principal.

(4)
$$\begin{aligned} & (a+1)^2 - a^2 \\ = {} & a^2 + 2a + 1 - a^2 \\ = {} & 2a + 1 \\ = {} & (a+1) + a. \end{aligned}$$
Rule.—Find the sum of the two numbers.

2. A mètre is 39·3708 inches: find to three places of decimals the number of acres in a hectare, which is 10,000 square mètres.

$$\text{No. of acres} = \frac{\overset{3·2809}{\cancel{39·3708}} \times \overset{3·2809}{\cancel{39·3708}} \times \overset{250}{\cancel{10000}}}{\underset{12}{\cancel{144}} \times 9 \times \underset{121}{\cancel{4840}}}$$

$$\begin{array}{r} = 3·2809 \\ 3·2809 \\ \hline 295281 \\ 2624720 \\ 65618 \\ 98427 \\ \hline 10·76430481 \\ 250 \\ \hline 1089)2691·0762025(2·471 \\ 2178 \\ \hline 5130 \\ 4356 \\ \hline 7747 \\ 7623 \\ \hline 1246 \\ 1089 \\ \hline 157 \end{array}$$

= 2·471....Ans.

3. The rainfall of 1 inch per sq. yd. weighs $46\frac{3}{4}$ lbs.: determine (to two places of decimals) the error in the statement that per acre it weighs 100 tons.

$$\begin{aligned} \text{Rainfall per acre} &= (46\tfrac{3}{4} \times 4840) \text{ lbs.} \\ &= \frac{187 \times 121\cancel{0}}{224\cancel{0}} \text{ tons} \\ &= \frac{22627}{244} \text{ tons} \\ &= 101·01\ldots\text{tons;} \end{aligned}$$

∴ Error = 1·01...tons too little. Ans.

4. Simplify $3\frac{7}{18}$ of $\frac{426}{427} \div 71 + 2\frac{3}{70}$ of $\frac{3}{65}$ of $\frac{5}{44} - \frac{7}{190}$ of $1\frac{11}{84}$.

$3\frac{7}{18}$ of $\frac{426}{427} \div 71 + 2\frac{3}{70}$ of $\frac{3}{65}$ of $\frac{5}{44} - \frac{7}{190}$ of $1\frac{11}{84}$

$$= \frac{\cancel{61}}{\underset{3}{\cancel{18}}} \times \frac{\overset{\cancel{6}}{\cancel{426}}}{\underset{7}{\cancel{427}}} \times \frac{1}{\cancel{71}} + \frac{\overset{\cancel{11}}{\cancel{143}}}{70} \times \frac{3}{\underset{\cancel{13}}{\cancel{65}}} \times \frac{\cancel{5}}{\underset{4}{\cancel{44}}} - \frac{\cancel{7}}{\underset{2}{\cancel{190}}} \times \frac{\cancel{95}}{\underset{12}{\cancel{84}}}$$

$$\begin{aligned} &= \tfrac{1}{21} + \tfrac{3}{280} - \tfrac{1}{24} \\ &= \frac{40 + 9 - 35}{840} \\ &= \tfrac{14}{840} \\ &= \tfrac{1}{60}. \text{ Ans.} \end{aligned}$$

5. Find the value of $\frac{18·7}{·204}$ of £2 12s. $- \frac{·94}{·083}$ of £16 12s.; and express the result as a decimal of £890.

$$\begin{aligned} \text{Value} &= \frac{18·7}{·204} \text{ of £2 12s.} - \frac{·94}{·083} \text{ of £16 12s.} \\ &= \left(\frac{\overset{275}{\cancel{18700}}}{\underset{3}{\cancel{204}}} \times \frac{52}{1} - \frac{\cancel{83}}{9\cancel{0}} \times \frac{100\cancel{0}}{\cancel{83}} \times \frac{332}{1}\right) \text{s.} \\ &= \left(\frac{14300}{3} - \frac{33200}{9}\right) \text{s.} \\ &= \frac{42900 - 33200}{9} \text{s.} \\ &= \frac{9700}{9} \text{s.;} \end{aligned}$$

$$\begin{aligned} \text{Fraction} &= \frac{97\cancel{00}}{9} \times \frac{1}{89\cancel{0} \times 2\cancel{0}} \\ &= \frac{97}{1602} \end{aligned}$$

$$\begin{array}{r} \text{Decimal} = 1602)\,9700\,(·060549 \\ 9612 \\ \hline 8800 \\ 8010 \\ \hline 7900 \\ 6408 \\ \hline 14920 \\ 14418 \\ \hline 502 \end{array}$$

= ·060549...Ans.

6. Forty-two pounds of Assam tea are mixed with twenty-four pounds of Darjeeling tea; how much Assam must be added in order that, in the new mixture, for every 17 lbs. Assam there may be 9 lbs. Darjeeling?

9 lbs. Darjeeling require 17 lbs. Assam,

24 „ „ „ $\frac{17 \times \overset{8}{\cancel{24}}}{\underset{3}{\cancel{9}}}$ lbs. Assam,

$= \frac{136}{3}$ lbs. Assam,

∴ Quantity of Assam to be added = $(45\frac{1}{3} - 42)$ lbs.

$= 3\frac{1}{3}$ lbs. Ans.

7. A and B can do a piece of work separately in 12 and 16 days respectively; they work together at it for 3 days, when A leaves, but B continues, and after 2 days is joined by C, and they finish it together in 3 days. In what time would C do it alone?

$$\begin{aligned} \text{Part done by C in 3 days} &= 1 - (\tfrac{1}{12} \times 3 + \tfrac{1}{16} \times 8) \\ &= 1 - (\tfrac{1}{4} + \tfrac{1}{2}) \\ &= \tfrac{1}{4}, \\ \text{Part done by C in 1 day} &= \tfrac{1}{12}, \end{aligned}$$

∴ C could do the work alone in 12 days. Ans.

8. At a game of skill A can give B 20 in 100, B can give C 15 in 100. How many can A give C?

A can get 100 while B gets 80,
B „ „ „ C „ 85,
B „ 80 „ C „ $\frac{\overset{17}{\cancel{85}} \times \overset{4}{\cancel{80}}}{\underset{\cancel{2}}{\cancel{100}}}$

= 68,

A can get 100 while C gets 68,

∴ A can give C 32 in 100. Ans.

9. Find the square root of $7\frac{79762}{88209}$.

$$7\frac{79762}{88209}$$
$$= \frac{88209 \times 7 + 79762}{88209}$$
$$= \frac{697225}{88209};$$

697225(835
64
163 | 572
| 489
1665 | 8325
| 8325

88209(297
4
49 | 482
| 441
587 | 4109
| 4109

∴ Square root $= \frac{835}{297}$
$= \underline{2\frac{241}{297}}$. Ans.

10. A man stakes his property in four successive ventures. In the first he loses 40 per cent.; in each of the others he gains 20 per cent. What percentage of profit remains on his outlay?

100
40
60
20 % = $\frac{1}{5}$ = 12
72
$\frac{1}{5}$ = 14·4
86·4
$\frac{1}{5}$ = 17·28
103·68

∴ Percentage of profit = 3·68.
= $\underline{3\frac{17}{25}}$. Ans.

11. Find the simple interest on £466 13s. 4d. for 6 years at 4 per cent. per annum, and the discount on £578 13s. 4d., due 6 years hence at 4 per cent. per annum. Why are the two results identical?

£ s. d.
466 13 4
6
2800 0 0
4
$\underline{£112\cdot\cancel{00}}$

∴ Interest = £112.

£ £ s. d. £
$\cancel{124}$: 578 13 4 :: $\cancel{24}$: Discount.
31 6 6
| 3472 0 0
$\underline{£112}$

∴ Discount = £112.

Note.—The two results are identical, as (£578 13s. 4d. − £112) or £466 13s. 4d. is the present worth of £578 13s. 4d., and the discount is the interest on the present worth.

12. What sum of money will amount to £13,022 2s. in three years at compound interest, the interest for the 1st, 2nd, and 3rd years being 6, 5, 4 per cent. respectively?

£
106
5·3
111·3
4·452 £ £
115·752 : 13,022·1 :: 100 : Principal.
£
= 115752)1302210000(11,250
115752
144690
115752
289380
231504
578760
578760

∴ Sum = $\underline{£11,250}$. Ans.

13. A man sells £39,300 four per cent. stock at 132, and invests the proceeds in stock, paying $2\frac{3}{4}$ per cent., whereby his income was diminished by £120 per annum; find the price he paid for the latter stock. (Neglect brokerage.)

Income in 1st case = 4% on £39,300
= £1,572;
" 2nd " = £1,572 − £120
= £1,452;
Stock in 2nd case = £1,452 × $\frac{100}{2\frac{3}{4}}$
= £1,452 × $\frac{400}{11}$
= £132 × 400
= £52,800;

∴ Price of stock in 2nd case $= \cancel{132} \times \frac{393\cancel{00}}{\cancel{528}\cancel{00}}$
4
= $\underline{98\frac{1}{4}}$. Ans.

Female Candidates.

FIRST YEAR.

Arithmetic.

(TWO *hours and a* HALF *allowed for this Paper.*)

No Candidate is permitted to answer more than TEN *questions.*

The *solution* must be given at such length as to make the method of working intelligible to the Examiner, otherwise the answer will be considered of no value.

1. Our 19,332 miles of railways earned in one year £66,615,377. Find (in pounds only) the receipts per mile. How would you show Standard III. children the approximate answer to be expected to such a problem? Illustrate your answer.

£ £
19,332)66,615,377(3,445
57996
86193
77328
88657
77328
113297
96660
16637

The remainder is 16 thousand and the divisor is 19 thousand, so that it would go nearly 6 times instead of 5 times, that is, if the amount were 3 thousand pounds more the quotient would be one more.

∴ The approximate answer is $\underline{£3,446.}$

2. In working a proportion sum by the method of unity, the logical method is first to perform the division, and afterward the multiplication. But in practice it is often more convenient to multiply first and then divide. Take the following problem, find the result by both methods, and explain as to a class of children which method you would prefer, and why:—
If 17 articles cost 3s. 6d., what will 265 articles cost?

If 17 articles cost 3s. 6d.,
1 article costs $\frac{3\text{s. }6\text{d.}}{17}$,

∴ 265 articles would cost $\frac{3\text{s. }6\text{d.} \times 265}{17}$;

First method = (3s. 6d. ÷ 17) × 265
= (42d. ÷ 17) × 265
= $2\frac{8}{17}$d. × 265
= (265 × 2)d. + $\frac{265 \times 8}{17}$d.
= 530d. + $\frac{2120}{17}$d.
= 530d. + $124\frac{12}{17}$d.
= $654\frac{12}{17}$d.
= 54s. $6\frac{12}{17}$d.
= $\underline{£2\ 14\text{s. }6\frac{12}{17}\text{d.}}$ Ans.

Second Method = (3s. 6d. × 265) ÷ 17
= (795s. + $132\frac{1}{2}$s.) ÷ 17
= 927s. 6d. ÷ 17
= 54s. $6\frac{12}{17}$d.
= £2 14s. $6\frac{12}{17}$d. Ans.

Note.—When the division can be performed exactly, the first method is more convenient. But when (as in this case) there is a remainder, the second method is preferable, as the multiplication of a fraction is avoided.

3. In a mixed school with 400 names on the rolls, the boys made 69,435 attendances and the girls 65,783 at 419 openings of the school; find—

(*a*) The average attendance of each sex; and

(*b*) The average number of attendances made by each child.

(*a*)

```
419)69,435(165·7
    419
    2753
    2514
     2395
     2095
      3000
      2933
        67
```

```
419)65,783(157
    419
    2388
    2095
     2933
     2933
```

Average attendance of boys = 165·7 } Ans.
,, ,, ,, girls = 157 }

(*b*.)

```
   69,435
   65,783
4,00 | 1352,18  = Total attendances.
       338·045 = Average number of
                 attendances made by
                 each child.
```

4. Express as the fraction of a ton:
$\frac{2}{5}$ of $\frac{3}{4}$ of a cwt. + $\frac{9}{20}$ of 15 cwt. 3 qrs. − 3 cwt. 2 qrs. 14 lbs.

Fraction

$$= \frac{\frac{2}{5}\text{ of }\frac{3}{4}\text{ cwt.} + \frac{9}{20}\text{ of 15 cwt. 3 qrs.} - \text{3 cwt. 2 qrs. 14 lbs.}}{\text{1 ton.}}$$

$$= \frac{\left(\frac{2}{5} \times \frac{3}{\cancel{4}} \times \frac{\cancel{4}}{1} + \frac{9}{20} \times \frac{63}{1} - 14\frac{1}{2}\right)\text{ qrs.}}{\text{80 qrs.}}$$

$$= \frac{\frac{6}{5} + \frac{567}{20} - \frac{29}{2}}{80}$$

$$= \frac{24 + 567 - 290}{80 \times 20}$$

$$= \frac{301}{1600}.\ \text{Ans.}$$

5. Find the cost of paper 27 inches wide for a room 14 ft. 6 in. by 12 ft. 6 ins., and 8 ft. in height from skirting board to cornice, at 9d. per piece of 12 yards, allowing a foot for waste to match the pattern in every length cut.

Perimeter of room = ($14\frac{1}{2}$ + $12\frac{1}{2}$) ft. × 2
= 27 ft. × 2
= 54 ft.;

No. of lengths of paper required = 54 ft. ÷ 27 in.

$$= \overset{2}{\cancel{54}} \times \frac{12}{\cancel{27}}$$

= 24;

Quantity of paper required = (24 × 9) ft.
= 72 yds.;

∴ Cost of paper = [(72 ÷ 12) × 9]d.
= 54d.
= 4s. 6d. Ans.

6. Two boys earn each one-fifth of their father's wages, their three sisters earn each one-sixth of his wages, and their mother earns half as much as each of her boys. The total earnings of the family for 52 weeks amount to £104. Find the weekly earnings of each member.

Weekly earnings of family = £104 ÷ 52 = £2;
Father's wages × (1 + $\frac{1}{5}$ × 2 + $\frac{1}{6}$ × 3 + $\frac{1}{10}$) = £2,
,, ,, × (1 + $\frac{2}{5}$ + $\frac{1}{2}$ + $\frac{1}{10}$) = £2,
,, ,, × $\frac{10 + 4 + 5 + 1}{10}$ = £2,
,, ,, × $\frac{20}{10}$ = £2,
,, ,, = £2 ÷ 2 = £1;
Each son's wages = $\frac{1}{5}$ of £1 = 4s.;
Each daughter's wages = $\frac{1}{6}$ of £1 = 3s. 4d.;
Mother's wages = $\frac{1}{2}$ of 4s. = 2s.

7. How many revolutions in a minute will be made by a carriage-wheel 4·55 feet in diameter, when the carriage is going at the rate of 10·4 miles in 1·25 hours? (Take $\frac{22}{7}$ as the ratio of the circumference to the diameter.)

Circumference of wheel = (4·55 × $\frac{22}{7}$) ft.
= (·65 × 22) ft.;

Distance travelled per minute = $\frac{10·4 \text{ miles}}{1·25 \times 60}$

$$= \frac{10·4 \times \overset{352}{\cancel{5280}}}{\cancel{75}}\text{ ft.}$$

$$= \frac{10·4 \times 352}{5}\text{ ft.};$$

∴ No. of revolutions per minute $= \frac{\overset{16}{\cancel{10·4}} \times \overset{16}{\cancel{352}}}{5 \times \cancel{·65} \times \cancel{22}}$
$= \frac{256}{5}$
= 51·2. Ans.

8. A is 2·6 times as old as B; B is ·9 times as C; C is 20 years old: find A's age.

A's age = 2·6 of ·9 of 20 years
= $2\frac{2}{3}$ of $\frac{9}{10}$ of 20 years

$$= \left(\frac{8}{3} \times \frac{\overset{3}{\cancel{9}}}{\cancel{10}} \times \frac{\cancel{20}}{1}\right)\text{years}$$

= 48 years. Ans.

9. A square pond, whose side is 75 feet, is begirt with a path $2\frac{1}{2}$ yards broad. Find the cost of asphalting this path at 9d. per square yard.

Area of path = (25 + $2\frac{1}{2}$) yds. × $2\frac{1}{2}$ yds × 4
= ($27\frac{1}{2}$ × 10) sq. yds.
= 275 sq. yds.;

∴ Cost of asphalting = (275 × 9)d.
= (825 ÷ 4)s.
= $206\frac{1}{4}$s.
= £10 6s. 3d. Ans.

10. What sum must be added to $\frac{9}{10}$ of $\frac{11}{16}$ of $\frac{5}{27}$ of £2 to make up 10s.?

$$\text{Sum} = \text{10s.} - \frac{\cancel{9}}{\underset{2}{\cancel{10}}}\text{ of }\frac{11}{16}\text{ of }\frac{5}{\underset{3}{\cancel{27}}}\text{ of £2}$$

$$= \text{10s.} - \frac{11 \times \overset{5}{\cancel{40}}}{2 \times \underset{2}{\cancel{16}} \times 3}\text{s.}$$

= 10s. − $\frac{55}{12}$s.
= 10s. − 4s. 7d.
= 5s. 5d. Ans.

11. How do you know at first sight whether a number is or is not divisible by 3, by 4, by 5, by 6, by 8, by 9, and by 10 respectively? Give examples.

A number is divisible :—

By 3, when the sum of its digits is divisible by 3, as 528. 5 + 2 + 8 = 15, and this is divisible by 3.

By 4, when the last two digits are divisible by 4, as 528. 28 is divisible by 4.

By 5, when the last digit is 5 or 0, as 285 and 360.

By 6, when the number is even and the sum of its digits is divisible by 3, as 528.

By 8, when the last three digits are divisible by 8, as 59,528. 528 is divisible by 8.

By 9, when the sum of its digits is divisible by 9, as 4,887. $4 + 8 + 8 + 7 = 27$, and this is divisible by 9.

By 10, when the last digit is 0.

12. On New Year's Day the population of a town was 18,500. The death rate was 20 per 1,000, and the birth rate 26 per 1,000: 120 people moved into the town, and 46 left it during the year. Find the percentage of increase at the year's end.

Increase in population—

$$\begin{aligned} &= 18{\cdot}5 \times (26 - 20) + 120 - 46 \\ &= 18{\cdot}5 \times 6 + 74 \\ &= 111 + 74 \\ &= 185; \end{aligned}$$

$$\therefore \text{Percentage of increase} = 185 \times \tfrac{100}{18500} = \underline{1.}\ \text{Ans.}$$

13. Explain, as to a class of scholars, the reason for inverting the divisor, in division of fractions.

Simplify—

$$\frac{3 - \frac{4}{11}}{4 + \dfrac{2}{1 - \frac{2}{13}}} + \tfrac{303}{3535}.$$

Suppose we have to divide 5 by $\frac{2}{3}$.

No. of thirds in $5 = 15$,

$$15 \div 2 = \tfrac{15}{2} \text{ or } 7\tfrac{1}{2}.$$

$$\text{Thus, } 5 \div \tfrac{2}{3} = \frac{5 \times 3}{2} = \tfrac{15}{2} = 7\tfrac{1}{2}.$$

Again, suppose we have to divide $\frac{5}{7}$ by $\frac{2}{3}$.

$\frac{5}{7} \div 2 = \frac{5}{14}$; but this result is 3 times too small, as we have to divide by the third part of 2.

$$\therefore \text{Quotient} = \frac{5 \times 3}{14} = \tfrac{15}{14} \text{ or } 1\tfrac{1}{14}.$$

$$\text{Thus, } \tfrac{5}{7} \div \tfrac{2}{3} = \tfrac{5}{7} \times \tfrac{3}{2} = \tfrac{15}{14} = 1\tfrac{1}{14}.$$

Whence the rule:—To divide by a fraction, invert the divisor and multiply.

$$\begin{aligned} &\frac{3 - \frac{4}{11}}{4 + \dfrac{2}{1 - \frac{2}{13}}} + \tfrac{303}{3535} \\ &= \frac{2\frac{7}{11}}{4 + \dfrac{2}{\frac{11}{13}}} + \tfrac{3}{35} \\ &= \frac{2\frac{7}{11}}{4 + \frac{26}{11}} + \tfrac{3}{35} \\ &= \tfrac{29}{70} + \tfrac{3}{35} \\ &= \frac{29 + 6}{70} \\ &= \tfrac{35}{70} \\ &= \underline{\tfrac{1}{2}.}\ \text{Ans.} \end{aligned}$$

14. What sum of money put out to simple interest at 4 per cent. will amount in $3\frac{3}{4}$ years to £1,616 2s. 8d.?

Amount of £100 for the time $=$ £100 $+$ £$(3\frac{3}{4} \times 4)$

$=$ £115;

$$\begin{array}{llll} & \pounds & \pounds\ \ \text{s.}\ \ \text{d.} & \pounds \\ \therefore & \overset{}{\underset{23}{\cancel{115}}} & : 1{,}616\ \ 2\ \ 8 & :: \underset{20}{\cancel{100}} : \text{Principal.} \\ & & \qquad\quad 20 & \end{array}$$

$$\begin{array}{l} 23\overline{)32{,}322\ 13\ 4}(1{,}405\pounds \\ \ \ \underline{23} \\ \ \ \ \ 93 \\ \ \ \ \ \underline{92} \\ \ \ \ \ \ \ 122 \\ \ \ \ \ \ \ \underline{115} \\ \ \ \ \ \ \ \ \ \ 7 \\ \ \ \ \ \ \ \ \ \underline{20} \\ \ \ \ \ \ \ 153(6\text{s.} \\ \ \ \ \ \ \ \underline{138} \\ \ \ \ \ \ \ \ \ 15 \\ \ \ \ \ \ \ \ \ \underline{12} \\ \ \ \ \ \ \ 184(8\text{d.} \\ \ \ \ \ \ \ \underline{184} \end{array}$$

$\therefore$ Sum $=$ £1,405 6s. 8d. Ans.

(To be continued.)

Locke's Thoughts Concerning Education.

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INTRODUCTORY.

I.—SKETCH OF THE LIFE OF LOCKE.

THE philosopher Locke was born at Pensford, near Bristol, in the year 1632. His father was a lawyer who took the part of the Parliamentarians in the civil strife during the reign of Charles I. His son John entered Westminster School at the age of fourteen, and remained until 1651. At the age of twenty he entered Christ College, Oxford, where he obtained his Bachelor's degree in 1655. After taking his Master's degree, he went as Secretary of Legation to Berlin, but returned the following year (1665) to Oxford, and entered upon the further pursuit of knowledge, which, with virtue, he considered the highest goal to which a man could attain. His studies partook of the nature of investigations in Natural Science, a branch of learning which at this time underwent a remarkable development, mainly due to the researches of Boyle and the genius of Newton. Locke began to prepare himself by his scientific pursuits for the medical profession, but a chance meeting between the young philosopher and the first Earl of Shaftesbury, resulted in Locke becoming a member of the nobleman's family as medical adviser, tutor, and friend. He shared, from time to time, in the political fortunes and misfortunes of his patron; at one time he is a State Secretary under his chief as Lord Chancellor; at another time an exile on the Continent, fearful of the displeasure of his sovereign, though never a sharer in political crime. It was during these periods of withdrawal from public work and care that his powerful mind found opportunity for gaining that knowledge and exercising that thought, which combined to yield, in his later days, the writings upon philosophy and education which have raised his name to universal and lasting renown.

Whilst with the Earl of Shaftesbury as his private secretary, Locke undertook the direction of the education of the earl's son and grandson. It was chiefly, however, with the latter that he had the opportunity of putting into actual practice the plans which are found in the 'Thoughts on Education.' These were first communicated in a series of letters to Mr. Clarke, a friend living near Taunton, who had sent a request to Locke, then an exile in Holland, that he would furnish advice upon the training and education of his son. A few years later, in 1693, at the urgent request of a Mr. William Molyneux, Locke was persuaded to collect the letters and publish them. This was done without the letters undergoing a thorough revision, and, as a consequence, there is a lack of style and completeness in the work as a whole, and very frequent and wearisome repetition of some of its parts.

With the accession of William and Mary, Locke felt at liberty to make England again his home. In 16 0 he published his great philosophical work, 'The Conduct of the Understanding.' Although pressed by his sovereign to become ambassador to one or other of the continental courts, Locke's health was such that he did not feel justified in accepting the honours and responsibilities of office. He chose rather to spend the remainder of his life in literary pursuits and in the seclusion of a country life. He retired to the abode of Sir Francis and Lady Masham at Oates, near Chipping Ongar, in Essex, where he found opportunity for another trial of his educational plans. Frank Masham, a child of four, was the subject of the experiment which was attended, in his case, with the most satisfactory results. After fifteen years of life, made happy by the society and generosity of his friends at Oates, and the growing popularity of his literary work, Locke died October, 1704, in the seventy-third year of his age.

In matters relating to education Locke was not a mere theorist. He gained his knowledge largely in the region of actual experience and work. His own formal education at Westminster and at Oxford extended over a period of nearly twenty years, but the book-learning at the former, and the lecturing, the disputations and the declamations at the latter, did not furnish the philosopher with the plans of education which he afterwards formulated. The memory of his own school and college days presented to his mind the form of exercise which, in practice, as tutor and adviser, he sought, for the most part, to avoid. Locke, however, formed an excellent habit, whilst at Oxford, for his own assistance in testing and confirming the knowledge he acquired. He says: 'I have often had experience that a man cannot well judge of his own notions till, either by setting them down on paper, or in discoursing them to a friend, he has drawn them out and, as it were, spread them fairly before himself.'

The power which Locke possessed of analysing knowledge into its mental elements, and the relations these bore to each other in the process of acquisition, induced in him a strong dislike to the classical training and dogmatic instruction of his day. He says:—

> 'I can no more know anything by another man's understanding than I can see by another man's eyes. So much I know, so much truth I have got; so far I am in the right, as I do really know myself; whatever other men have, it is in their possession—it belongs not to me, nor can be communicated to me but by making me alike knowing; it is a treasure that cannot be lent or made over.'

This determination to accept for knowledge only that which his judgment approved and his reason confirmed, led Locke to caution his student against mistaking the existence of words and phrases in the memory for real knowledge. He says:—

> 'Words are of no value nor use but as they are the signs of things; when they stand for nothing they are less than cyphers, for instead of augmenting the value of those they are joined with, they lessen it, and make it nothing; and where they have not a clear, distinct signification, they are like unusual or ill-made figures, that confound our meaning.'—(Locke's Essay 'Of Study.')

> 'Knowing is seeing, and if it be so it is madness to persuade ourselves we do so by another man's eyes, let him use ever so many words to tell us that what he asserts is very visible. Till we ourselves see it with our own eyes, and perceive it by our own understandings, we are as much in the dark and as void of knowledge as before, let us believe any learned author as much as we will.' (Locke on the Understanding.)

With the following quotation from the essay 'Of Study,' we must be content in our review of a few of of the fundamental ideas which guided Locke in his plans for early education.

> 'I will only say this one thing concerning books, that however it has got its name, yet converse with books is not, in my opinion, the principal part of study: there are two others that ought to be joined with it, each whereof contributes their share to our improvement in knowledge; and those are meditation and discourse. Reading, methinks, is but collecting the rough material, amongst which a great deal must be laid aside as useless. Meditation is, as it were, choosing and fitting the materials . . . and raising the building; and discourse with a friend (for wrangling in a dispute is of little use) is, as it were, surveying the structure, walking in the rooms, and observing the symmetry and agreement of its parts, taking notice of the solidity or defects of the works, and the best way to find out and correct what is amiss; besides that, it helps often to discover truths, and fix them in our minds as either of the other two.'

Leaving Locke's adverse criticism of the system of education pursued in the schools and colleges of his day, and turning to the plan of instruction which he would substitute for it, we find the following general conditions of learning prominently set forth:—

1. The scheme of instruction is limited almost entirely to the plan Locke would advise for the education of an English gentleman. Hence a private tutor is essential, who 'is to fashion the carriage and form the mind; to settle in his pupil good habits and the principles of virtue and wisdom; to give him vigour, activity and industry; to teach him application, and accustom him to take pains, and to give him some little taste of what his own industry must perfect.' The 'Public School' is not considered a suitable place for the training of a gentleman. 'What qualities,' says Locke, 'are ordinarily to be got from such a troop of playfellows, as schools usually assemble together from parents of all kinds, that a father should so much covet, is hard to divine.

2. The course of study which Locke proposes is not arranged in view of the value of each subject as a means of mental discipline, so much as for the practical value each acquisition possesses for the purposes of life and good society.

(*a*) Reading is to follow speech. 'When he can talk it is time he should begin to learn to read. . . . Great care is to be taken that it be never made as a business to him, nor the look on it as a task.'

(*b*) Writing is to be taught when English can be read well, and 'when he (the pupil) can write well and quick it may be convenient to improve the use of it further in drawing.'

(*c*) 'Latin,' says Locke, 'I look upon as absolutely necessary to a gentleman, and, indeed, custom which prevails over everything has made it so much a part of education that even those children are whipped to it, and made spend many hours of their precious time uneasily in Latin, who, after they are gone from school are never to have more to do with it as long as they live.'

(*d*) 'Because French is a living language, and to be used more in speaking, that should be first learned, that the yet pliant organs of speech may be accustomed to a due formation of those sounds, and beget the habit of pronouncing French well.'

(*e*) English as a subject of study is held in high esteem by Locke. He says, 'Since it is English that an English gentleman will have constant use of, that is the language he should chiefly cultivate and wherein most care should be taken to polish and perfect his style.'

(*f*) Geography is recommended for early school days whilst the memory is most active. The study is to begin with positions in and around the home, followed by learning the positions and names of countries on a map; and completed by a study of the globe, the celestial sphere, and the planetary system.

(*g*) History is highly valued for the instruction it yields, and the delight which the study affords. Locke recommends a course of general chronology followed by Latin history, before the pupil begins the history of his own country.

(*h*) Correct speech is held to be acquired not by the observance of rules so much as by gaining sound and full knowledge, and by reading the best authors. Locke says, 'I have seldom or never observed any one to get the skill of reasoning well, or speaking handsomely by studying those rules which pretend to teach it.' 'Make children,' he says, 'as soon as they are capable of it, often tell a story of any kind they know; and correct at first the most remarkable fault they are guilty of in their way of putting it together.'

(*i*) Respecting Science, Locke 'would not deter any one from the study of nature, because all the knowledge we have, or possibly can have of it, cannot be brought into a Science.'

(*j*) 'Arithmetic is the easiest, and consequently the first sort of abstract reasoning which the mind commonly bears, and is of so general use in all parts of life and business that scarce anything is to be done without it.'

3. Learning is subordinate to the formation of habits and character. 'As years increase,' says Locke, 'liberty must come with them; and in a great many things he must be trusted to his own conduct, since there cannot always be a guard upon him, except what you have put into his own mind by good principle and established habits, which is the best and surest, and therefore *most to be taken care of*.'

4. Every subject of study is to be carefully graduated. 'In this, as in all other parts of instruction, great care must be taken with children to begin with that which is plain and simple, and to teach them as little as can be at once, and settle that well in their heads before you proceed to the next.'

5. The love of knowledge is to be inculcated. 'His tutor should remember that his business is not so much to teach him all that is knowable, as to raise in him a love and esteem of knowledge.'

6. In conclusion, it should be remembered that Locke was a physician, and, as such, in charge of a youth of weak frame, he enjoins a number of physical exercises for the hardening and strengthening of the body. These, together with the chapters upon discipline, and the formation of habits and character, do not enter into the course prescribed for this year's study. The chapters 140 to 190 (inclusive) of the work '*Some Thoughts concerning Education*' will be taken in successive numbers of this journal, with explanation necessary for the complete preparation of the subject.

(*To be continued.*)

Publications Received.

Bell & Sons.—Cambridge Texts with Notes:—Virgil's Æneid, Books III. to XII.; The Schoolmaster's Calendar, 1889; Lexicon of Conversational French (*A. Holloway*); Notes on Shakspere's Macbeth (*T. Duff Barnett*)

Bemrose & Sons.—The Jubilee Drawing Copy Book, Nos. 1 to 17.

Blackie & Son.—The Sovereign Reader Home Lesson Book; Realistic Elementary Geography (*Baker*); Sonntag's French Grammar, Part IV. and Complete; Inorganic Chemistry (*Humboldt Sexton*).

Curwen & Sons.—The Musical Herald, January; Music:—Nursery Toy March (*Clanvill & Deane*); School Cantata—Les francs Chasseurs (*T. Mee Pattison*).

Deacon, G. W., & Co.—Physiography (*E. Hull, M.A.*).

Fisher Unwin, T.—The Century Magazine, February.

Heywood, John.—Outline of English Literature (*J. C. Wright.*)

Houlston & Sons.—The 'Beautiful Valley' Series of Sermons to Children, Nos. 9 and 10 (*Rev. T. Bruster*).

Longmans & Co.—Longmans' Junior School Grammar (*D. Salmon*); Longmans' School Arithmetic (*Marshall & Welsford*).

Macmillan & Co.—Easy Arithmetical Examples for Beginners (*Bradshaw*).

Nelson, T., & Sons.—The Royal Arithmetic Test Books, Standards 3, 4, 5, 6, and 7.

Relfe Bros.—The Theory of Perspective (*F. Harris*).

Skerry & Co.—Practical Papers in Higher Arithmetic (*Skerry*).

Whittaker & Co.—French Grammar (*Barrère*); Whittaker's Modern French Authors:—Victor Hugo's Bug Jargal (*Boïelle*); Daudet's La Belle Nivernaise (*Boïelle*).

Publications Reviewed.

The Century Readers Home Lesson Books. Nos. I., II. and III. London: Blackie and Son.

In these Home Lesson Books will be found such portions of the Century Readers as need to be learnt—the spelling lessons, the dictation exercises, the poems for recitation, the verbal explanations, and the course of instruction in Grammar. By the use of such hand books children may be saved the expense of buying the reading-books, and the latter, being kept for use in class, may be spared much wear and tear.

The Century Readers: No. IV. London: Blackie and Son.

This is a recent addition to the series lately commended in these columns for the freshness of the matter, the careful graduation of the lessons, and the general attractiveness of appearance. The present volume is marked by similar merits in equal degree. Some of the lessons are inserted by permission of the Editors of 'The Boys' Own Paper' and 'The Girls' Own Paper'; and the romantic story of Robin Hood occupies twelve chapters. A good selection of short poems is given, those near the end of the book being specially suitable for recitation. There are many exercises in spelling, dictation, and grammar. The books are well-printed, well-illustrated, and neatly bound.

Notes on Shakespeare's Play of Macbeth.

By T. Duff Barnett, B.A. London: George Bell and Sons.

The tragedy of Macbeth is likely in the course of this year to become very familiar to many persons. Not only is it appointed by the Education Department for preparation by students in training colleges, and by other examining authorities for other students, but it is specially brought before the general public in its revival on a grand scale by the most celebrated of living actors. The little book before us does not contain the text of the play, but forms an admirable companion to any edition, and affords every kind of help the student is likely to need. The introduction contains a striking criticism on the spirit and meaning of the play; and the 'summary of the tragedy scene by scene' constitutes a valuable running commentary on the progress of the action. Professor Skeat, Dr. Abbott, Dr. Morris and other authorities have evidently been largely consulted in the construction of the notes, which deal with the verbal difficulties in a satisfactory manner. A series of eleven appendices treat separately and fully such subjects as the Prosody of the play, the Grammar, Allusions, Anachronisms, Simile and Metaphor, and others, concluding with more than forty examination questions.

Elsa and the Imprisoned Fairy. A Cantata for Juvenile Voices.

By J. G. Bettany and T. Murby. London: Thomas Murby.

If we mistake not, this is, musically, the most pretentious and at the same time the most successful work of the kind that Mr. Murby has yet produced.

It may be performed simply as a musical work by young people in ordinary evening dress, or with the effects of action, costume, and scenery. If the latter method be preferred, full directions are given at the beginning of the book.

The music throughout is 'singable'; and good straightforward melodies, always effective, and often exceedingly bright and tuneful, sustain the interest from the outset to the close.

The printing and general 'get up' are all that could be desired, and the book is remarkably free from the typographical errors which so often disfigure a new work and frustrate the composer's intention.

The only slip of the kind which we notice occurs on page 27, 2nd score, 3rd bar, where there are some rather objectionable consecutive 5ths between the bass and the melody.

Royal Arithmetic Test Book.

Standards III.—VII. London and Edinburgh: T. Nelson and Sons.

These are little penny books each containing forty-eight examination tests, of four sums each in Arithmetic. The examples are practical and fairly within the capacity of the average scholar.

(a). Royal Object Lesson Sheets.
(b). Royal Object Lesson Reader.
(c). Royal Notes of Lessons.

London and Edinburgh: T. Nelson and Sons.

This eminent publishing firm is continually bringing out something new for use in our elementary schools. One of its latest efforts is in furnishing the above series for use in Infant Schools. The Object Lesson Sheets (a) are forty in number, bound in cloth, of large size, and faced on both sides. The lessons on the sheets are eighty in number, are printed in bold type which can be seen without effort by a very large class. They are very well chosen and contain a large stock of words of one syllable, and easy dissyllables. Each card contains two chromo lithographed pictures the subjects of which form the bases of the lessons.

Along with the sheets a reader (b), page for page with the sheets, and with similar pictures in black and white is published, while for the use of teachers a shilling book containing the Reader and notes for 250 object lessons completes the series. The teacher will be hard to please who cannot find among these sufficiently varied material to satisfy the most fastidious inspector. Certainly children who for one, two, or three years in a school where they are used cannot leave without intelligence developed and knowledge of common things increased. We should advise infant teachers on the look out for something new to see these publications.

Matriculation Directory, No. 4.

Cambridge: The University Correspondence College Office.

This volume of the Tutorial Series has now grown into a book of 132 pages. It is a guide to the reading suitable for those who wish to pass the Matriculation Examination of the London University. It contains a good deal of useful information. Books for the various subjects are recommended, and the parts selected which are essential for the purpose in hand. The special subjects for January and June, 1889, are inserted, and all the papers set in June, 1888. In the shilling edition before us the answers to these questions are given in full. A cheaper edition is published without them. Students who are depending mainly upon their own efforts would find this little book of service to them. The book list is a good one. It is sure not to please everybody. We could not ourselves recommend a few of those chosen. More than one of them, unless we are mistaken, are really not in the market. Additions and corrections will no doubt be made in each edition.

Lessons in Elementary Mechanics.

W. H. Grieve, P.S.A. London: Longmans & Co.

This is a series of lessons in that part of mechanics which is prescribed in the new code for the first stage. The book contains fifteen chapters and about 150 pages. It is clearly printed, well illustrated, and strongly and handsomely bound. It is a book which may be recommended. It is much above the average, and, though not perfect, is a sign that there is a serious effort being made to raise the style of the ordinary manuals for boys on other than literary subjects. When statements are made for a boy's information, statements which he reads over and over again, and perhaps learns by heart, we think it is more important that he should read an accurate statement which he cannot quite understand, than that he should read a statement which he can understand but which is not true. We are always sorry, therefore, to see inaccuracies even, we had almost said especially, in children's books. Hence we object to sentences like these: 'Solids always occupy the same space, and retain the same shape.' 'Liquids occupy the same amount of space.' 'Gases have no shape of their own, nor are they confined to one particular size.' One would imagine, from reading about the lactometer on page 86, that by using it 'we may infer the amount of water which has been added to the milk.' The milkmen know better. The experiment on page 94 is not well described. Any one repeating it for the first time would be not a little surprised. The tube is quite full, and we are then told to place the flask in a mixture of pounded ice, and allow to cool; down to 4 C., the author says, we observe the water to sink. As a matter of fact, when the flask is first put into the ice-cold water, there will be a sudden rise of the fluid in the tube if it is not full, and an overflow if it is. This is so marked, and so strange to those who do not understand it, that it ought to have been explained. If the water in the flask were cold at first, and then plunged into hot water, there would be a sudden temporary fall in the tube. Both cases need explanation. We have already said the book is well illustrated. Where these have been borrowed from other works there is a good reason why they retain both the merits and the faults of the originals. But where they are new, one does not see why they should not have been copies of things which the children could be expected to handle at home, and which any teacher, even in a poor neighbourhood, could obtain for himself. We will give one example. On page 111 there is a can, with seive bottom. The children would be pleased to see the experiment; but their delight would have been increased ten-fold if they had been taught to take a coffee or cocoa canister, prick one hole in the top, and as many as they like at the bottom; immerse the bottom in water, and press it down till full; then place their finger upon the hole and lift it out, and do with it all that could be done with the apparatus drawn in the book. If science is to be of any use we must study things as well as books. There is danger in too much expensive apparatus, and too elaborately appointed laboratories. Let us simplify the essentials as far as possible.

The Educational Annual. By E. Johnson. London: George Philip & Son.

The introduction says that this book is designed to place within reach of the general public a concise summary of authentic information relative to primary and secondary education at a moderate cost. Nearly 300 pages are occupied in giving it, about 150 being devoted to the former, and 100 to the latter. The report of the Royal Commission is summarised in about 36 pages, no difficulty being experienced in deciding the bias of the compiler. In fact, the book is marred in more places than one by the expression of the opinion or the assumptions of the writer. For example, on page 56 he says: 'Sir Francis Sandford's reservation is by far the most important, and *very likely has the approval of the majority of the Commissioners.* Surely, if they approved, they would have signed the reservation. The compiler seems to believe in the principle of payment by results, and patronisingly gives advice to the members of the National Union of Elementary Teachers. He admits that there may be many omissions in his book, and of this we have found plenty of evidence. His knowledge of geography seems limited, for he places Newcastle-on-Tyne in the county of Durham. Among the theological colleges he inserts one at Sunderland which has been closed some time, and omits one at Manchester which is the only one belonging to a great Methodist body. There are many items of statistical information omitted which are necessary to its being, what it aims to be, an 'Educationist's, Schoolmaster's, and Teacher's Handbook.' As, however, it is the first year of publication, we must accord the compiler some praise for having collected a large mass of information, limited though some of it may be, in regard to the primary and secondary education of the country.

Elementary Statics. By Rev. J. B. Lock, M.A. London: Macmillan & Co.

This is a companion volume to that on Dynamics, to which we called attention on a former occasion. It is especially intended for those who are studying for the matriculation of the London University, and examinations of a similar nature, though it is at the same time an introduction to the study of Physics and Practical Mechanics. The whole treatment of the subject is based upon Newton's laws of motion, the accustomed proofs of the fundamental propositions, based upon the principle of the transmissibility of force, being given in a separate chapter. The word resolute, as the abbreviation for resolved past, is introduced. We need hardly say that the subject is treated with that lucidity and skill which are conspicuous in all Mr. Lock's books. The student who masters it, and works the examples, need not fear any fair test of his knowledge. He will have made a good start with a difficult subject, and will find, as he advances, that he has nothing to unlearn. This is high praise, but it is deserved. When excellence has been attained in the exposition of the fundamental propositions of Mechanics, it will be of importance that there should not be too much innovation. Students suffer when every professor treats the subject as if no one had gone before him, or had to come after him.

Practice and Help in the Analysis of Sentences. By C. P. Mason, B.A. London: Bell & Sons.

Like everything Mr. Mason has written for schools, this book has been well done. In the preface he says it is the outcome of the experience and study of a good many years! We can well believe him, for only the experience gained by the examination of thousands of papers could have made him acquainted with all the difficulties he assists in solving, and the various exercises he includes in this book. Teachers may prefer other names for various parts of articles to those which are used in this volume, but there are few helps which they need which cannot be found in it.

Bridge's Class Drawing Sheets, Standard IV. *(a)* Drawing to Scale, *(b)* Model Drawing. London: A. G. Dawson.

We are greatly pleased with these sheets. Mr. Bridge evidently knows what is wanted, and how to supply the want. The Scale Drawing Sheets are varied in character, and admirable in every respect. The Model Drawing Sheets are based upon the principles of perspective, which are employed in teaching the drawing of the slab, square, cube, cone, and cylinder. Each figure is drawn in two colours, so no difficulty is experienced in knowing which part of the figure to construct first. The sheets can be very highly commended.

Commercial Précis-Writing. By the Rev. John Hunter, M.A. London: Longmans, Green and Co.

The useful art of digesting and condensing correspondence for business purposes is taught and illustrated in this book by a systematic and graduated course of instruction and examples. After the introductory observations which explain the nature and object of précis-writing, and show what marks should characterise good abstracts, chapters follow in which the pupil is led on through the successive steps of abridging phrases, reducing complex sentences, omitting less important details, and removing redundant and ornamental expressions to the exercise of summarising a series of letters. Numerous examples for practice are given in each chapter. The work is likely to prove useful to candidates for the commercial examinations recently established by the Oxford and Cambridge Schools Examination Board.

Handbooks to the Code Examinations. Standards I. and II. Manchester: J. Heywood.

The Author of "How to pass 90 per cent. and earn Excellent," has collected a large number of examination questions given by inspectors in various parts of the country in grammar, spelling, geography and mental arithmetic, and published them in two little books for use a few weeks before the annual inspection. They will be a great help in varying the style of question into which most teachers are apt to fall, and will form suitable tests for ascertaining the intelligence of the classes for which they are designed.

The Royal Upper Class Readers. Simple History of English Literature, with Illustrative Extracts. By A. L. Stronach. London: T. Nelson and Sons.

The greater part of this volume consists of a well-written narrative of the history of our literature, including, as it should, sketches of the lives of the writers who made it worthy of our study. The work is written in an easy and fluent style, suited to attract and interest young readers. The chapters on Goldsmith, and Dr. Johnson and his friends, are as entertaining as a novel; and those on 'Poets of Nature'—Thomson, Ramsay, Burns and Cowper,—and on William Wordsworth, and Wordsworth's friends, are calculated to encourage a healthy love of nature and appreciation of the poetic spirit. We note here and there a peculiarity of expression which strikes us as a Scotticism; for instance, within two pages of the chapter on 'the Elizabethan Drama,' we notice 'the lad would likely be taken to see them play,'—'he likely thought the open fields and gardens of Stratford a better nursery,'—and 'likely whatever he could get.' The later chapters appear to be free from such idioms. The illustrative extracts include many favourite passages, and nearly all are worthy of being committed to memory. Portraits of the most famous writers embellish the volume.

Teachers' Syllabus Book of Work. London: A. G. Dawson.

This little book is issued to save the time of the head teacher. Most teachers are in the habit of apportioning the work of the year for their junior assistants, and examining at stated periods. The Syllabus book is arranged so that the work to be done is written on one page of an opening of the book and the result of the examination opposite. A record is thus kept from month to month of the progress being made in the class. Practical teachers will at once see the advantage to be gained by adopting the system.

Euclid: Books I.—IV. Arranged by A. E. Layng, M. A. London: Blackie and Son.

Each of the first four books is published separately, and the whole in one volume. Simpson's text is followed, no fundamental changes being made. The features of the book are—clean figures with construction lines fainter than other parts of the figures; text, figures, notes and exercises on the propositions all on the same opening of the book; additional problems worked out; a very large number of easy exercises as well as more difficult ones selected from various examination papers; the free use of abbreviations and signs allowed by the various examining bodies; and the displacement of some of Euclid's proofs by well known shorter ones.

The Edition is well-printed, strongly bound, and very serviceable for school purposes.

Longman's Junior School Grammar. By D. Salmon. London: Longman, Green and Co.

We noticed Mr. Salmon's School Grammar in this magazine a short time ago. The Junior School Grammar is the earlier part of that book with such omissions and additions as for the purpose intended were thought suitable. An easier and better introduction to the study of grammar it would be difficult to conceive.

Syllabic Spelling: A Series of Easy Word Lessons. Compiled by Charles Barton. Part I.—For Infant Classes. Part II.—For Standard I. London: George Bell and Sons.

These little books may prove useful to teachers who prefer to teach spelling from a special book rather than from the usual reading books. The words are arranged in sets of twenty and twenty-four, each set illustrating a particular sound or combination of letters. It does not appear that graduation has been sufficiently kept in view, for in the first lesson of Part I. we find the words *wrap* and *chapel*, and in the same Part are included words like *scythe*, *oyster*, *quarry*, *feign*, and many others equally difficult.

Teachers' Drawing Manual for Kindergarten and Infant Schools. By W. Bridge. London: A. G. Dawson, Ivy Lane.

For sixpence any teacher of an Infant School or class can get twenty capital graduated drawing copies, with full notes of lessons. Mr. Bridge is a competent guide to the manufacture of numberless simple designs, which may be formed by little children on squared slates or paper. No more pleasant occupation could be found for infants, and every teacher who gets the book will thank us for drawing attention to it.

Practical Plane and Solid Geometry. By John Carroll. London: Burns and Oates, 63, Paternoster Row.

In its new form, this tenth edition of Mr. Carroll's work, containing a complete course of Elementary Geometry for both Science and Art Students, with its new Lessons on Areas, Orthographic Projection and Graphic Arithmetic, bids fair to gain a still more extended popularity—a success which it richly deserves. The book is cheap, the type clear, the figures bold and well engraved, and the directions leave nothing to be desired.

Milton's Comus. Edited with Introduction and Notes by A. M. Williams, M.A. London: Longmans, Green and Co.

The introduction to this edition of 'Comus' deals with masques in general, the history of the poem, the grammar, the words, the figures of speech and the rhythm. All these subjects are amply and clearly treated, especially the last. In the Notes, which are brief and pointed, sufficient information is given on every difficulty and peculiarity. The book is carefully printed, and is thoroughly adapted for the use of students preparing the poem for examination.

Chambers's Expressive Readers. Books I. and II. London and Edinburgh: W. & R. Chambers.

Good bold type, strong binding, neat covers, thoroughly readable lessons carefully graduated, illustrations adapted to the text, suitable poetry, lists of words, tables, and writing lessons, are the characteristic features of these new readers. What more can teachers want?

Lessons on Light. By Miss Adams. London: Relf Brothers.

This is a small book of 42 pages on light. The author thinks it is possible 'to give a correct, though elementary, idea of the theory of light to children of an early age, and to illustrate the lessons by objects easily obtainable.' Whether such a thing is possible we will not attempt to decide, but it is certain the book before us does not accomplish it. Easy, entertaining, and instructive experiments can be devised, which will amuse children, and serve as a ground-work of facts to be drawn upon afterwards. But to state a number of conclusions without evidence or illustration, and to fancy the ability to repeat these statements is teaching the principles of science, is a great mistake. Such so-called teaching is worse than none. The short chapter on mirrors does not contain a single illustration. We print a third of it as a specimen of the book. 'A mirror is a highly polished surface, showing, by reflection, the objects presented to it. Mirrors are plane or curved. Mirrors are made of metal in some form. The glass mirrors with which we are familiar reflect by reason of the metal behind the glass. Glass alone could not reflect, because, as we have before seen, nearly all the rays are transmitted through a transparent body, leaving none to be reflected.' We think that the children who have to learn science according to this method had better wait; they can spend the time more profitably.

Daisy Dell. A Fairy Operetta. By I. Despicht and Edmund Rogers. London: Curwen and Sons.

This is a short and effective work suitable for school entertainments. The argument is as follows:—Oberon and Titania, seated on a flowery throne, summon their subjects to repel an invasion of fairyland by the spirits of Mischief. When the fairies of Fun arrive they bring in, bound with magic cords, a spy of Prince Hecate's named Mother Grumpy. As punishment, Oberon commands the fairies to attend to her wounds, comfort her with words of hope, and finally to induce her to laugh.

All perform their tasks, and Tipitwidgit succeeds with her so well that the witch laughs outright. As soon as she does this she is (according to a spell) changed to the good fairy Ariel, Hecate's threats are safely defied, and all ends well with a fairy roundelay.

The music, in addition to being pleasing and tuneful, is light and graceful, and moreover *fairly easy*. We can highly recommend the operetta to teachers in search of a novelty.

The Call to Song. By John Evans and A. L. Cowley. London: Curwen and Sons.

This inexpensive and valuable work embraces the 'Educational Music Charts,' of the Tonic Sol-Fa Method, (compiled for school use by the same co-workers), and additional exercises in voice-training, expression and pronunciation. It also includes the requirements of the Tonic Sol-Fa 'Junior' and 'Elementary' Certificates, and the 'rhythms' or time-tests required for the latter.

When we add that Mr. Evans is the Superintendent of Singing to the School Board for London, and Mr. Cowley the Music Superintendent to the Bradford School Board, it will be evident that the 'Call to Song' is the result of sound and practical knowledge and experience of the highest kind, and a copy of the book should be in the library of every School-Music Teacher. We cannot too highly recommend it.

The Universal parsing Book. By R. Deakin, M. A. London: Relfe Brothers.

This is an ordinary close ruled exercise book, ruled for parsing in such a way as to be suitable for exercises in any language. It is well adapted for the purpose.

The Voices of Nature. An Operetta for Young Voices. By N. B. Sargent. London: Curwen and Sons.

Flowers, bees, birds and frogs, are the voices of Nature, represented, and the characters may be taken by boys and girls, or, if desired, by girls alone.

The introductory march is not very striking, but the music improves considerably as we get further into the work—the music for the frogs being particularly good and appropriate.

There are no difficulties of any kind to be met with in the operetta, which may be regarded as a good specimen of the kind of music required for 'young voices.'

Evangeline. A Cantata for Equal Voices. Adapted and Compiled by J. Graham. London: Curwen and Sons.

Much good and familiar music is comprised in this little work. The Compiler has selected both words and music with commendable care and judgment, and the cantata cannot fail to prove popular. It may be performed under exceptionally easy circumstances, and is admirably suited for school use. We should have preferred some of the pieces in a lower key, especially 'The Anchor's Weighed,' the present settings being rather too high for ordinary voices.

Too Bad, or Discontented Judith. A Children's Operetta. Adapted and Compiled by A. J. Foxwell. London: Curwen and Sons.

Mr. Foxwell's name is sufficient to commend this little work to the attention of our readers. We need only say that the music and words are suitable for school use that the operetta contains no special difficulties and that the melodies are generally bright and attractive.

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